

MCW - MCR

Water chillers and heat pumps TECHNICAL MANUAL GB



water - water units and motoevaporating

5 kW - 39 kW

CE

R407C

UFR Galletti
AIR CONDITIONING

INDEX

1	THE SERIES	2
2	UNIT DESCRIPTION	3
3	CONSTRUCTIVE FEATURES	3-4
4	MCW MODELS AND CONFIGURATIONS	5
5	MCR MODELS AND CONFIGURATIONS	6
6	MCW C RATED TECHNICAL DATA	7
7	MCW H RATED TECHNICAL DATA	8
8	MCR C RATED TECHNICAL DATA	9
9	MCW C COOLING CAPACITY	10-11
10	MCW H COOLING CAPACITY	12-13
11	MCW H HEATING CAPACITY	14-15
12	MCR C COOLING CAPACITY	16-17
13	OPERATING LIMITS	18
13.1	MCW OPERATING LIMITS	18
13.2	MCR OPERATING LIMITS	18
14	CALCULATION FACTOR	19
15	AVAILABLE HEAD PRESSURE OF THE PUMPS	19
16	WATER PRESSURE DROPS	20
17	WATER CIRCUIT (USER SIDE)	21
18	MCW OVERALL DIMENSIONS	22-23
19	MCR OVERALL DIMENSIONS	24-25
20	DRY COOLER	26
20.1	DRY COOLER TABLE MATCHING	26
21	REMOTE CONDENSERS	26-29
21.1	REMOTE CONDENSER TABLE MATCHING	26
21.2	DESIGN CRITERIA FOR REFRIGERANT PIPING	27
21.3	REFERENCE FOR ON SITE INSTALLED PIPES	27
21.4	CONNECTION EXAMPLES	28-29
21.4.1	Remote condenser installed above the condenserless unit	28
21.4.2	Remote condenser installed below the condenserless unit	29
22	PLACING THE UNIT AND TECHNICAL SPACE	30

1 THE SERIES

MCW and **MCR** chillers, heat pumps and motor driven evaporating units are designed for residential and light-duty commercial applications and in some cases for industrial applications with 24 h/day operation. MCW chillers are available in a completely enclosed version for a low noise operation, thanks to the use of scroll-type compressors. Thanks to their compact dimensions, the pre-assembled hydraulic components and their attractive design, they are suitable for a variety of environments and do not need to be installed in dedicated rooms. The design philosophy has favoured the development of units having a reduced height with water or cooling (MCR) connections from above and pre-assembled piping system, which reduce installation time and costs and the need for technical space.

The large number of sizes making up the series and the available accessories allow a broad range of possible configurations, which make the MCW series an ideal solution for speeding up installation on the building site.

Only top quality components are used for the cooling, hydraulic and electric systems guaranteeing high technical level of the MCW chillers in terms of efficiency, reliability and reduced noise levels.

All the units are available in single circuit configurations.

Derived from the **MCW** water-condensed chiller range the **MCR** motordriven evaporating units are available in standard and low-noise version for cooling function only.

The many options that complete the unit include remote condensers with axial fans, vertical or horizontal air flow, in standard or low-noise version and heat recovery function (desuperheater 40%).

DECLARATION OF CONFORMITY

Galletti S.p.A., whose head office is located at 12/a Via Romagnoli 12/a Bentivoglio (Bologna) - Italy, hereby declares, under its own responsibility, that the water chillers and heat pumps belonging to the series: (see table below), units intended for applications in civil air conditioning systems, comply with the requirements of **EEC Directives 2006/42/CE, 2004/108/CE, 2006/95/CE and 97/23/CE (PED)**.

These units are the result of an assembly of components [compressors, brazed plate heat exchangers, liquid receivers, pipes, control and safety valves] which are individually provided, where required, with certification in accordance with current directives: the category to which the machines belong is determined on the basis of an analysis of the components subject to the PED and corresponds to the highest category among the components used. For each series of machines, the conformity of the assembly has been assessed by notified bodies, applying the assessment procedures (forms) pursuant to annex II of the PED - Directive **97/23/CE**, as shown in the following table:

FIELD OF APPLICATION

The **MCW-MCR** units are designed to cool-heat water and solutions containing up to 30% glycol (percentage by weight) in civil, industrial and technological air-conditioning systems. In buildings with large surface areas, the air conditioning system can be expanded step by step as new floors or areas are sold/leased, by installing an MCW unit for every floor in a small control room. This allows you to spread your investment over time.. The possibility of keeping the evaporator indoors means there is no need to add glycol to the water inside the system. In addition, you can keep all components requiring routine or special maintenance in an easily accessible room.

Bentivoglio, 22/12/2011

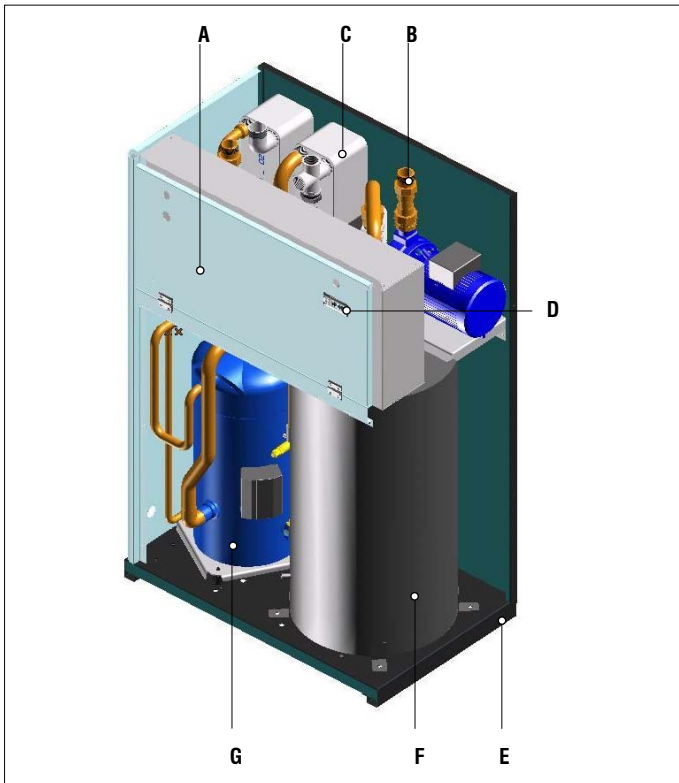
Serie Range	Grandezza Size	Organismo Notificato Notified body	N° certificato certificate	Procedura di valutazione di conformità Conformity Compliance Module	Categoria PED PED category	Marcatura Marking
MCC - MCC H	6 - 7 - 9 - 12 - 15	0425	2422/0	Modulo D1	I	CE
MCC - MCC H	18 - 22 - 25 - 33 - 37	0425		Modulo D1	II	CE + PED
MCW - MCW / H	5 - 7 - 10 - 12 - 15	0425		Modulo D1	I	CE
MCW - MCW / H	18 - 20 - 22 - 27 - 31 - 39	0425		Modulo D1	II	CE + PED
MPE - MPEH MCE - MCEH	4 - 5 - 7 - 8	0425		Modulo D1	I	CE
MPE - MPEH MCE - MCEH	9 - 10 - 11 - 13 - 15 - 18	0425		Modulo D1	I	CE
MPE - MPEH MCE - MCEH	19-20-21-23-24-26-27-28-31-32-34-35-39-40	0425		Modulo D1	II	CE + PED
MPE - MPEH MCE - MCEH	T30 - T34 - T40 - T45	0425		Modulo D1	II	CE + PED
MPE - MPEH	54 - 66	0425		Modulo D1	II	CE + PED
MPI	15	0425		Modulo D1	I	CE
MPI	27	0425		Modulo D1	II	CE + PED
MFE	5 - 6 - 8 - 12 - 13 - 16 - 17 - 20 - 23	0425		Modulo D1	I	CE
MXE - MXE E	9 - 11 - 14 - 16	0425		Modulo D1	I	CE
MXE - MXE E	19 - 21	0425		Modulo D1	II	CE + PED
MCP	7 - 9 - 10 - 13 - 15	0425		Modulo D1	I	CE
MCP	18-27-32-40-T18-T22-T24-T30	0425		Modulo D1	II	CE + PED
LCE - LCE H	42 - 52 - 62 - 72 - 82	0425		Modulo D1	II	CE + PED
	91/2/4 - 101/2/4 - 121/2/4 141/2/4 - 161/2/4 - 174 - 194 - 214					

Galletti S.p.A.
Luca Galletti

Water Chillers and heat pumps are in accordance with the law 97/23/CE (PED) filling in D1 form, approved by the third notified body ICIM N° 0425.

2 UNIT DESCRIPTION

- A** The electric control board is constructed and wired in accordance with EEC Directive **72/23**, Directive **89/336** on electromagnetic compatibility and related standards.
- B** All the units have plumbing connections upwards, thus contributing to a considerable reduction of the minimum clearance for installation and maintenance operations. A water flow control device is available upon request. In addition to this device an outlet water temperature sensor is available, that performs the function of an antifreeze thermostat.
- C** Only heat exchangers with stainless steel braze-welded plates are used.
- D** Microprocessor control; the Basic version featured on standard models is a μ Chiller controller.
- E** Painted galvanised sheet steel supporting base. Panelling: enclosing panels made of galvanised sheet steel coated with epoxy polyester power (**RAL 7035**) contribute to an attractive design suitable for installations in residential environments.
- F** Upon request the units can be equipped with built-in water pump and water storage reservoir, the latter being placed on the water circuit outlet.
- G** Only Scroll-type compressors are used in all **MCW and MCR** units.



3 CONSTRUCTIVE FEATURES

STRUCTURE

The **MCW** and **MCR** units are built with a galvanised sheet steel supporting base, coated with epoxy polyester powder paint oven cured at 180°C, and enclosing panels made of Peraluman (alloy of Aluminium and Magnesium 5005), which provides effective protection against corrosive agents.

The compressor compartment is completely sealed and may be accessed on 3 sides thanks to easy-to-remove panels that greatly simplify maintenance and/or inspection.

All the ordinary maintenance can be out from the front of the unit.

For lifting the unit, 50-mm holes are provided in the base, through which lifting pipes can be inserted and the vibration-damping feet can be accessed for fastening.

All bolts and screws and fastening devices are made of non-oxidizable materials, stainless steel or carbon steel that has undergone surface-passivating treatments.

COOLING CIRCUIT

The cooling circuit is built using only components of the finest quality brands produced by qualified manufacturers according to the specifications of Directive 97/23 for brazing.

All the units are made with a single cooling circuit.

COMPRESSORS

Only scroll-type compressors are used in the **MCW** and **MCR** units, both in single and tandem configurations, with thermal protection on windings and crankcase electric heater (heat pump models).

COOLING COMPONENTS

- Molecular mesh dehydration filter.
- Flow indicator with humidity indicator.
- Thermostatic valve with external equalization and integrated MOP function.
- Electronically controlled electric expansion valve, which optimises energy consumption in in-between seasons (accessory).
- Cycle-reversing valve (heat pump models only).
- Check valves (heat pump models only).
- Liquid receiver (heat pump models only).
- High and low pressure switches.
- Schrader valves for checks and/or maintenance.

HEAT EXCHANGERS, WATER SIDE

All units have heat exchangers with braze-welded AISI 304 austenitic stainless steel plates and connections made of AISI 304 L, characterised by a reduced carbon content to facilitate brazing.

REMOTE CONDENSER - OPTIONAL (ONLY FOR MCR UNITS)

It is realized in geometry 25x21.65 with 3/8" pipe, made up with aluminium fins of the thickness of 0,10 mm and copper piping expandend on the same in order to guarantee the complete contact. Low noise versions for this component are available and also the option of the condensation control by means of fan speed control.

The device of condensation control (optional) is part of the remote condenser and it does not require the electrical connection to motoevaporating unit. The finned package exchangers are realized with advanced technologies of exchange, louvered fins and inner striped tubes for the reduction of volumes and therefore of the refrigerant charges.

VENTILATION SECTION - OPTIONAL (REMOTE CONDENSER AND DRY COOLER)

The used fans are axial type with airfoil-shaped blades. The fans are statically and dynamically balanced, provided with a protective outlet grille complying with the specifications of **EN 60335 – DIN 31001-1-2** and with interposed rubber vibration dampers to reduce the propagation of vibrations during speed modulating phases (optional).

The technical and dimensional data reported in this manual may be modified in view of any product improvement.

3 CONSTRUCTIVE FEATURES

ELECTRIC CONTROL BOARD

Constructed and wired in accordance with EEC Directive 73/23, Directive 89/336 on electromagnetic compatibility and related standards.

The electric box may be accessed by removing the outer panel; access to the components is possible only after the unit has been disconnected from the power supply by means of the main switch, which is interlocked with the door.

All the remote controls use 24 V signals powered by an insulating transformer situated on the electric control board.

All users are protected against overloads and short circuits; thermal protection is provided by chains of thermistors embedded in the windings of each electric motor. Another standard feature of all units is a phase sequence relay, which disables the compressor in the event of an incorrect phase sequence: for scroll compressors, only one direction of rotation is possible. The protection rating of the unit is IP 44 and the control board with the panel open has a protection rating of IP20.

The terminal board also includes terminals for remote signalling of:

- unit on/off (24 V lamp)
- alarms (24 V lamp).

CONTROL MICROPROCESSOR



MCW and **MCR** water chillers and heat pumps are supplied complete with a microprocessor control. the "Basic" version installed in standard units features the following functions:

- control of the different operating parameters from a set of pushbuttons situated on the electric control board;
- switching on and off of compressors to maintain the set temperature of the water entering the water/refrigerant exchanger;
- display of operating parameters ;
- alarm management and signalling
 - high / low pressure
 - antifreeze
 - flow switch
 - pump alarm
- control of maximum number of compressor starts;
- compressor operation hour meter;
- RS232, RS485 serial output management on request.

4 MCW MODELS AND CONFIGURATIONS

The **MCW** series is composed by 11 models, in cooling and heating version.

They are available both in models with a cooling function only and in models with heat pump operation.

The numerous constructive options may be selected using the configuration scheme illustrated below.

The choice of some options can prevent the choice of others or render obligatory other fields. To contact the Galletti for verification

CODE		OPTION AND UNIT CONFIGURATION	
Commercial name of the series		15 fields which customise the unit complying with customer's requirements	
MCW	water condensed water chiller and heat pump	Field	Name. Description
Model		1	Refrigerant / Power supply
005	provides general indications as to the cooling capacity of standard models	0	R407C - 230/1/50
007		1	R407C - 400/3/50 + N
010		2	R407C- 400/3/50 with 230V built-in transformer for functions requiring 230V power supply
012		2	Microprocessor / Exp. valve
015		0	basic (mChiller) + traditional valve
018		A	basic (mChiller) + electronic valve
020		0	not present
022		C	with adjustment of water flow rate
027		4	Pump and water tank
031		0	not present
039		1	pump only
Operation		2	pump and tank
C	cooling only	5	Port for remote communication
H	heat pump	0	not present
Version		2	RS485
S	standard	6	Cooling accessories
L	low noise	0	not present
		M	Pressure gauges
		7	Compressor options
		0	not present
		8	Water condenser option
		T	oversized condenser for city water/dry cooler
		9	Remote control board
		0	not present
		S	simplified *
		M	mChiller microprocessor
		10	Package
		0	standard
		1	wooden crate
		2	wooden box
		11	Dampers
		0	not present
		G	base vibration dampers (rubber type)
		12	Accessories
		0	not present
		13	Dry cooler / remote condenser
		0	not present
		A	Dry Cooler
		B	Dry Cooler with condensing control
		C	Remote condenser
		D	Remote condenser with condensing control
		14	Dry cooler / remote condenser
		0	not present
		1	standard version: horizontal air flow
		2	standard version: vertical air flow
		3	low-noise version: horizontal air flow
		4	low-noise version: vertical air flow
		15	Execution
		0	standard
		S	special

* In a Gewiss box with ON indicator light, low-priority alarm (e.g. pump breakdown), serious alarm (e.g. unit stopped) and ON-OFF switch. All powered at 24 Vac through an insulating transformer

5 MCR MODELS AND CONFIGURATIONS

The **MCR** series comprises 11 models.

They are available both in models with a cooling function only.

The numerous constructive options may be selected using the configuration scheme illustrated below.

The choice of some options can prevent the choice of others or render obligatory other fields. To contact the Galletti for verification

CODE	
Commercial name of the series	
MCR	motoevaporating units
Model	
005	provides general indications as to the cooling capacity of standard models
007	
010	
012	
015	
018	
020	
022	
027	
031	
039	
Operation	
C	Water chiller
Version	
S	standard
L	low noise

OPTION AND UNIT CONFIGURATION		
15 fields which customise the unit complying with customer's requirements		
Field	Name	Description
1	Refrigerant / Power supply	
	0	R407C - 230/1/50
	1	R407C - 400/3/50 + N
2	R407C- 400/3/50 with 230V built-in transformer for functions requiring 230V power supply	
	2	
2	Microprocessor / expansion valve	
	0	basic (mChiller) + traditional valve
A	basic (mChiller) + electronic valve	
	A	
3	Condensation control	
	0	not present
4	Pump and water tank	
	0	not present
1	only pump	
	2	pump + tank
5	Remote communication	
	0	not present
2	RS485	
	2	
6	Cooling accessories	
	0	not present
M	Pressure gauges	
	M	
7	Compressor options	
	0	not present
8	Water condenser option	
	0	not present
9	Remote control board	
	0	not present
S	simplified *	
	M	mChiller microprocessor
10	Package	
	0	standard
1	Wooden crate	
	2	Wooden case
11	Dampers	
	0	not present
G	base vibration dampers (rubber type)	
	G	
12	Accessories	
	0	not present
13	Dry cooler / remote condenser	
	0	not present
A	Dry Cooler	
	B	Dry Cooler with condensing control
C	Remote condenser	
	D	Remote condenser with condensing control
14	Dry cooler / remote condenser	
	0	not present
1	standard version: horizontal air flow	
	2	standard version: vertical air flow
3	low-noise version: horizontal air flow	
	4	low-noise version: vertical air flow
15	Execution	
	0	standard
S	special	
	S	

* In a Gewiss box with ON indicator light, low-priority alarm (e.g. pump breakdown), serious alarm (e.g. unit stopped) and ON-OFF switch. All powered at 24 Vac through an insulating transformer

6 MCW-C RATED TECHNICAL DATA water chillers

MCW - CS / CL		005 M	005	007 M	007	010 M	010	012
Cooling capacity	kW	5,55	5,5	7,04	7	9,9	9,9	12,2
Power supply	V - ph - Hz	230-1-50	400-3-50 + N	230-1-50	400-3-50 + N	230-1-50	400-3-50 + N	400-3-50 + N
Rated power input	kW	1,32	1,3	1,74	1,7	2,34	2,3	2,75
Rated current absorbed	A	6,26	3,17	8,27	3,47	11,21	4,71	6,7
Maximum current absorbed	A	12	4,2	15	5,1	23,1	7	10
Starting ampere	A	47	24	61	32	100	46	50
Evaporator water flow	l/h	954	946	1211	1203	1703	1704	2098
Evaporator water pressure drop	kPa	28	27	31	31	27	27	31
Condenser water flow	l/h	390	386	498	494	695	693	849
Condenser water pressure drop	kPa	4	4	6	6	5	5	7
Scroll compressor / refrigerant circuit	Nr.	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
Plates evaporator	Nr.	1	1	1	1	1	1	1
Plates condenser	Nr.	1	1	1	1	1	1	1
Water content on user side	dm ³	2,1	2,1	2,1	2,1	2,6	2,6	2,6
Pump available head (option)	kPa	77	78	68	69	60	60	124
Pump power supply	kW	0,25	0,25	0,25	0,25	0,25	0,25	0,33
Buffer tank water content (option)	dm ³	47	47	47	47	47	47	92
GAS Hydraulic connections		1"	1"	1"	1"	1"	1"	1" 1/2
Dimensions: height	mm	830	830	830	830	830	830	1270
Dimensions: length	mm	705	705	705	705	705	705	812
Dimensions: depth	mm	453	453	453	453	453	453	508
Weight of standard unit	kg	103	103	106	106	108	108	118
Weight of unit with pump and tank	kg	138	138	141	141	143	143	168
MCW-CS sound power level	dB(A)	55	55	55	55	59	59	61
MCW-CS sound pressure level	dB(A)	47	47	47	47	51	51	53
MCW-CL sound power level	dB(A)	53	53	53	53	57	57	59
MCW-CL sound pressure level	dB(A)	45	45	45	45	49	49	51
MCW - CS / CL		015	018	020	022	027	031	039
Cooling capacity	kW	14,9	17,8	20,2	21,9	26,9	31,2	38,7
Power supply	V - ph - Hz					400-3-50 + N		
Rated power input	kW	3,4	3,95	4,4	4,9	6,3	7,2	8,9
Rated current absorbed	A	8,58	9,39	11,22	12,04	15,56	18,12	21,1
Maximum current absorbed	A	13	14	16	17	20	29	32
Starting ampere	A	66	74	101	98	130	130	135
Evaporator water flow	l/h	2562	3062	3458	3766	4627	5367	6656
Evaporator water pressure drop	kPa	27	30	26	29	26	29	28
Condenser water flow	l/h	1039	1235	1392	1522	1885	2181	2703
Condenser water pressure drop	kPa	4	6	5	6	5	7	7
Scroll compressor / refrigerant circuit	Nr.	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
Plates evaporator	Nr.	1	1	1	1	1	1	1
Plates condenser	Nr.	1	1	1	1	1	1	1
Water content on user side	dm ³	3,1	3,1	3,6	3,6	3,9	4,3	4,6
Pump available head (option)	kPa	113	92	135	125	106	82	129
Pump power supply	kW	0,33	0,33	0,45	0,45	0,45	0,45	0,75
Buffer tank water content (option)	dm ³	92	92	92	92	92	92	92
GAS Hydraulic connections		1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2
Dimensions: height	mm	1270	1270	1270	1270	1270	1270	1270
Dimensions: length	mm	812	812	812	812	812	812	812
Dimensions: depth	mm	508	508	508	508	508	508	508
Weight of standard unit	kg	121	125	167	203	210	219	233
Weight of unit with pump and tank	kg	171	175	217	253	260	269	283
MCW-CS sound power level	dB(A)	61	61	61	62	62	65	65
MCW-CS sound pressure level	dB(A)	53	53	53	54	54	57	57
MCW-CL sound power level	dB(A)	59	59	60	60	60	63	63
MCW-CL sound pressure level	dB(A)	51	51	52	52	52	55	55

- **Cooling capacity:** evaporator water temperature 12°C / 7°C, condenser water temperature 15/30°C.
- **Sound power** measured according to standards ISO 3741 - ISO 3744 and EN 29614-1
- **Sound pressure** level referred to the following conditions: in free field, 1 m. distance, directional factor 2.

7 MCW-H RATED TECHNICAL DATA heat pumps

MCW - HS / HL		005 M	005	007 M	007	010 M	010	012
Cooling capacity	kW	5,3	5,3	6,8	6,8	9,6	9,6	11,8
Power supply	V - ph - Hz	230-1-50	400-3-50 + N	230-1-50	400-3-50 + N	230-1-50	400-3-50 + N	400-3-50 + N
Rated power input (in cooling mode)	kW	1,32	1,3	1,74	1,7	2,34	2,3	2,75
Rated current absorbed (in cooling mode)	A	6,26	2,62	8,27	3,47	11,21	4,71	5,63
Evaporator water flow	l/h	911	911	1170	1169	1651	1651	2029
Evaporator water pressure drop	kPa	25	25	29	29	25	25	29
Condenser water flow	l/h	376	375	485	482	678	675	826
Condenser water pressure drop	kPa	4	4	6	6	4	4	6
Heating capacity	kW	6,02	5,9	7,75	7,6	10,8	10,6	13,1
Rated power input (in heating mode)	kW	1,67	1,64	2,19	2,14	2,96	2,9	3,47
Rated current absorbed (in heating mode)	A	8,51	3,28	11,51	4,44	15,63	5,99	7,05
Condenser water flow	l/h	1035	1015	1334	1307	1858	1823	2254
maximum current absorbed	A	12	4,2	15	5,1	23,1	7	10
Starting Ampere	A	47	24	61	32	100	46	50
Condenser water pressure drop	kPa	30	29	45	43	32	31	47
Scroll compressor / refrigerant circuit	Nr.	1	1	1	1	1	1	1
Plates evaporator	Nr.	1	1	1	1	1	1	1
Plates condenser	Nr.	1	1	1	1	1	1	1
Water content on user side	dm3	2,1	2,1	2,1	2,1	2,6	2,6	2,6
Pump available head (option)	kPa	91	92	84	85	78	79	148
Pump power supply	kW	0,25	0,25	0,25	0,25	0,25	0,25	0,33
Buffer tank water content (option)	dm3	47	47	47	47	47	47	92
GAS Hydraulic connections		1"	1"	1"	1"	1"	1"	1" 1/2
Dimensions: height	mm	830	830	830	830	830	830	1270
Dimensions: length	mm	705	705	705	705	705	705	812
Dimensions: depth	mm	453	453	453	453	453	453	508
Weight of standard unit	kg	106	106	109	109	112	112	123
Weight of unit with pump and tank	kg	141	141	144	144	147	147	173
MCW-HS sound power level	dB(A)	55	55	55	55	59	59	61
MCW-HS sound pressure level	dB(A)	47	47	47	47	51	51	53
MCW-HL sound power level	dB(A)	53	53	53	53	57	57	59
MCW-HL sound pressure level	dB(A)	45	45	45	45	49	49	51

MCW - HS / HL		015	018	020	022	027	031	039
Cooling capacity	kW	14,5	17,3	20,1	21,2	26,1	30,3	37,5
Power supply	V - ph - Hz	400-3-50 + N						
Rated power input (in cooling mode)	kW	3,4	3,89	4,4	4,9	6,3	7,2	8,9
Rated current absorbed (in cooling mode)	A	7,43	7,37	9,37	10,2	13,15	15,23	17,38
Evaporator water flow	l/h	2494	2976	3458	3647	4489	5212	6450
Evaporator water pressure drop	kPa	26	28	26	27	24	27	26
Condenser water flow	l/h	1016	1204	1392	1483	1840	2130	2635
Condenser water pressure drop	kPa	4	6	5	6	5	7	7
Heating capacity	kW	16	19,2	21,6	23,59	29	33,6	41,7
Rated power input (in heating mode)	kW	4,28	4,91	5,5	6,2	7,9	9,1	11,2
Rated current absorbed (in heating mode)	A	8,95	9,88	11,89	12,63	16,34	19,04	22,34
Condenser water flow	l/h	2751	3303	3715	4058	4989	5779	5343
maximum current absorbed	kPa	13	46	37	46	38	50	18
Starting Ampere	A	66	14	16	17	20	29	32
Condenser water pressure drop	A	31	74	101	98	130	130	135
Scroll compressor / refrigerant circuit	Nr.	1	1	1	1	1	1	1
Plates evaporator	Nr.	1	1	1	1	1	1	1
Plates condenser	Nr.	1	1	1	1	1	1	1
Water content on user side	dm3	3,1	3,1	3,6	3,6	3,9	4,3	4,6
Pump available head (option)	kPa	148	140	122	158	151	139	149
Pump power supply	kW	0,33	0,33	0,45	0,45	0,45	0,45	0,75
Buffer tank water content (option)	dm3	92	92	92	92	92	92	92
GAS Hydraulic connections		1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2
Dimensions: height	mm	1270	1270	1270	1270	1270	1270	1270
Dimensions: length	mm	812	812	812	812	812	812	812
Dimensions: depth	mm	508	508	508	508	508	508	508
Weight of standard unit	kg	125	132	175	209	221	236	247
Weight of unit with pump and tank	kg	175	182	225	259	271	286	297
MCW-HS sound power level	dB(A)	61	61	61	62	62	65	65
MCW-HS sound pressure level	dB(A)	53	53	53	54	54	57	57
MCW-HL sound power level	dB(A)	59	59	59	60	60	63	63
MCW-HL sound pressure level	dB(A)	51	51	51	52	52	55	55

- **Cooling capacity:** evaporator water temperature 12°C / 7°C, water temperature to the condenser 15/30°C
- **Heating capacity:** condenser water temperature 40/45°C, water temperature to the evaporator 15°C
- **Sound power** measured according to standards ISO 3741 - ISO 3744 and EN 29614-1
- **Sound pressure** level referred to the following conditions: in free field, 1 m. distance, directional factor 2.

8 MCR-C RATED TECHNICAL DATA

MCR - CS / CL		005 M	005	007 M	007	010 M	010	012
Cooling capacity	kW	4,8	4,8	6,2	6,2	8,6	8,6	10,76
Power supply	V - ph - Hz	230-1-50	400-3-50 + N	230-1-50	400-3-50 + N	230-1-50	400-3-50 + N	400-3-50 + N
Rated power input	kW	1,63	1,6	2,16	2,1	2,96	2,9	3,5
Rated current absorbed	A	7,63	2,96	9,99	3,77	13,84	5,36	6,3
Maximum current absorbed	A	12	4,2	15	5,1	23,1	7	10
Starting ampere	A	47	24	61	32	100	46	50
Evaporator water flow	l/h	825	825	1066	1067	1478	1480	1851
Evaporator water pressure drop	kPa	26	26	30	30	26	26	30
Scroll compressor / refrigerant circuit	Nr.	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
Plates evaporator	Nr.	1	1	1	1	1	1	1
Water content on user side	dm ³	2,1	2,1	2,1	2,1	2,6	2,6	2,6
Pump available head (option)	kPa	81	81	72	72	67	67	133
Pump power supply (option)	kW	0,25	0,25	0,25	0,25	0,25	0,25	0,33
Buffer tank water content (option)	dm ³	47	47	47	47	47	47	92
Dimensions: height	mm	830	830	830	830	830	830	1270
Dimensions: length	mm	705	705	705	705	705	705	812
Dimensions: depth	mm	453	453	453	453	453	453	508
MCR-CS sound power level	dB(A)	55	55	55	55	59	59	61
MCR-CS sound pressure level	dB(A)	47	47	47	47	51	51	53
MCR-CL sound power level	dB(A)	53	53	53	53	57	57	59
MCR-CL sound pressure level	dB(A)	45	45	45	45	49	49	51
MCR - CS / CL		015	018	020	022	027	031	039
Cooling capacity	kW	13	15,6	17,6	19,2	23,5	27,3	33,9
Power supply	V - ph - Hz	400-3-50 + N						
Rated power input	kW	4,3	5	5,6	6,2	8	9,1	11,2
Rated current absorbed	A	8,39	8,85	10,76	11,52	15,04	16,96	19,97
Maximum current absorbed	A	13	14	16	17	20	29	32
Starting ampere	A	66	74	101	98	130	130	135
Evaporator water flow	l/h	2236	2683	3028	3302	4042	4695	5831
Evaporator water pressure drop	kPa	26	29	26	29	26	29	28
Scroll compressor / refrigerant circuit	Nr.	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
Plates evaporator	Nr.	1	1	1	1	1	1	1
Water content on user side	dm ³	3,1	3,1	3,6	3,6	3,9	4,3	4,6
Pump available head (option)	kPa	125	107	145	136	122	101	136
Pump power supply (option)	kW	0,33	0,33	0,45	0,45	0,45	0,45	0,75
Buffer tank water content (option)	dm ³	92	92	92	92	92	92	92
Dimensions: height	mm	1270	1270	1270	1270	1270	1270	1270
Dimensions: length	mm	812	812	812	812	812	812	812
Dimensions: depth	mm	508	508	508	508	508	508	508
MCR-CS sound power level	dB(A)	61	61	61	62	62	62	65
MCR-CS sound pressure level	dB(A)	53	53	53	54	54	54	57
MCR-CL sound power level	dB(A)	59	59	59	60	60	60	63
MCR-CL sound pressure level	dB(A)	51	51	51	52	52	52	55

- **Cooling capacity** in the matching with the remote condenser indicate in the manual: evaporator water temperature 12°C / 7°C , condensing air temperature 35°C
- **Sound power** measured according to standards ISO 3741 - ISO 3744 and EN 29614-1
- **Sound pressure** level referred to the following conditions: in free field, 1 m. distance, directional factor 2.

9 MCW C COOLING CAPACITY

Legend:

- Twe₁** Evaporator water inlet temperature (user side)
- Twe₂** Evaporator water outlet temperature (user side)
- Twc₂** Condenser water outlet temperature (dissipator side)
- PF** Cooling capacity
- PA** Absorbed power input
- PD** Capacity at condenser

MCW C	Twc2	°C	30			35			40			45		
	Twe1	Twe2	PF	PA	PD	PF	PA	PD	PF	PA	PD	PF	PA	PD
	°C	°C	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
MCW 005 CM	10	5	5,13	1,33	6,46	5,09	1,40	6,49	4,96	1,57	6,53	4,62	1,76	6,38
	12	7	5,55	1,32	6,87	5,50	1,40	6,90	5,35	1,56	6,91	4,98	1,75	6,73
	14	9	6,04	1,31	7,35	5,94	1,39	7,33	5,73	1,56	7,29	5,33	1,75	7,08
	16	11	6,60	1,30	7,90	6,44	1,38	7,82	6,12	1,55	7,67	5,73	1,74	7,47
	18	13	7,19	1,28	8,47	6,93	1,38	8,31	6,53	1,54	8,07	6,12	1,74	7,86
MCW 005 C	10	5	5,10	1,31	6,41	4,99	1,38	6,37	4,72	1,56	6,28	4,42	1,75	6,17
	12	7	5,50	1,30	6,80	5,38	1,38	6,76	5,09	1,55	6,64	4,78	1,74	6,52
	14	9	5,94	1,29	7,23	5,78	1,38	7,16	5,48	1,55	7,03	5,18	1,74	6,92
	16	11	6,37	1,28	7,65	6,20	1,37	7,57	5,91	1,54	7,45	5,57	1,73	7,30
	18	13	6,81	1,27	8,08	6,64	1,36	8,00	6,32	1,53	7,85	5,96	1,73	7,69
MCW 007 CM	10	5	6,53	1,75	8,28	6,32	1,88	8,20	5,93	2,10	8,03	5,55	2,36	7,91
	12	7	7,08	1,74	8,82	6,80	1,87	8,67	6,40	2,11	8,51	5,97	2,35	8,32
	14	9	7,61	1,72	9,33	7,31	1,87	9,18	6,88	2,10	8,98	6,45	2,34	8,79
	16	11	8,18	1,71	9,89	7,85	1,86	9,71	7,38	2,09	9,47	6,96	2,33	9,29
	18	13	8,77	1,69	10,46	8,39	1,85	10,24	7,93	2,07	10,00	7,46	2,31	9,77
MCW 007 C	10	5	6,49	1,71	8,20	6,27	1,84	8,11	5,90	2,07	7,97	5,51	2,33	7,84
	12	7	7,00	1,70	8,70	6,75	1,84	8,59	6,39	2,06	8,45	5,95	2,33	8,28
	14	9	7,53	1,69	9,22	7,28	1,83	9,11	6,87	2,07	8,94	6,44	2,32	8,76
	16	11	8,09	1,67	9,76	7,82	1,83	9,65	7,38	2,06	9,44	6,94	2,31	9,25
	18	13	8,69	1,65	10,34	8,36	1,82	10,18	7,93	2,05	9,98	7,43	2,30	9,73
MCW 010 CM	10	5	9,23	2,36	11,59	8,95	2,51	11,46	8,40	2,81	11,21	7,83	3,16	10,99
	12	7	9,90	2,34	12,24	9,60	2,50	12,10	9,03	2,81	11,84	8,44	3,15	11,59
	14	9	10,65	2,32	12,97	10,30	2,50	12,80	9,71	2,80	12,51	9,10	3,14	12,24
	16	11	11,43	2,30	13,73	11,04	2,49	13,53	10,42	2,78	13,20	9,76	3,13	12,89
	18	13	12,26	2,28	14,54	11,81	2,48	14,29	11,14	2,78	13,92	10,44	3,12	13,56
MCW 010 C	10	5	9,20	2,31	11,51	8,96	2,46	11,42	8,47	2,77	11,24	7,89	3,12	11,01
	12	7	9,93	2,30	12,23	9,66	2,45	12,11	9,11	2,77	11,88	8,53	3,12	11,65
	14	9	10,66	2,28	12,94	10,36	2,45	12,81	9,80	2,76	12,56	9,20	3,11	12,31
	16	11	11,44	2,26	13,70	11,10	2,45	13,55	10,50	2,75	13,25	9,88	3,10	12,98
	18	13	12,21	2,24	14,45	11,82	2,44	14,26	11,23	2,74	13,97	10,58	3,09	13,67
MCW 012 C	10	5	11,36	2,78	14,14	10,98	2,99	13,97	10,37	3,34	13,71	9,72	3,71	13,43
	12	7	12,23	2,75	14,98	11,79	2,99	14,78	11,15	3,33	14,48	10,46	3,71	14,17
	14	9	13,10	2,73	15,83	12,63	2,98	15,61	11,96	3,32	15,28	11,25	3,71	14,96
	16	11	14,05	2,70	16,75	13,53	2,96	16,49	12,83	3,31	16,14	12,08	3,70	15,78
	18	13	15,03	2,66	17,69	14,45	2,95	17,40	13,75	3,29	17,04	12,96	3,69	16,65

9 MCW C COOLING CAPACITY

Legend:

- Twe₁** Evaporator water inlet temperature (user side)
- Twe₂** Evaporator water outlet temperature (user side)
- Twc₂** Condenser water outlet temperature (dissipator side)
- PF** Cooling capacity
- PA** Absorbed power input
- PD** Capacity at condenser

MCW C	Twc2	°C	30			35			40			45		
	Twe1	Twe2	PF	PA	PD	PF	PA	PD	PF	PA	PD	PF	PA	PD
	°C	°C	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
MCW 015 C	10	5	13,79	3,38	17,17	13,41	3,59	17,00	12,64	4,00	16,64	11,83	4,45	16,28
	12	7	14,93	3,40	18,33	14,46	3,62	18,08	13,64	4,03	17,67	12,79	4,47	17,26
	14	9	16,09	3,42	19,51	15,58	3,65	19,23	14,71	4,06	18,77	13,81	4,51	18,32
	16	11	17,33	3,44	20,77	16,73	3,69	20,42	15,82	4,09	19,91	14,85	4,54	19,39
	18	13	18,59	3,47	22,06	17,93	3,73	21,66	16,97	4,13	21,10	15,94	4,57	20,51
MCW 018 C	10	5	16,48	3,94	20,42	15,91	4,24	20,15	15,00	4,73	19,73	14,12	5,27	19,39
	12	7	17,84	3,94	21,78	17,15	4,27	21,42	16,17	4,75	20,92	15,17	5,30	20,47
	14	9	19,22	3,96	23,18	18,41	4,29	22,70	17,35	4,78	22,13	16,28	5,33	21,61
	16	11	20,64	3,95	24,59	19,73	4,32	24,05	18,59	4,80	23,39	17,46	5,35	22,81
	18	13	22,06	3,96	26,02	21,06	4,34	25,40	19,87	4,82	24,69	18,68	5,37	24,05
MCW 020 C	10	5	18,69	4,38	23,07	18,15	4,68	22,83	17,13	5,23	22,36	16,03	5,86	21,89
	12	7	20,15	4,40	24,55	19,51	4,72	24,23	18,42	5,27	23,69	17,26	5,89	23,15
	14	9	21,63	4,43	26,06	20,92	4,76	25,68	19,78	5,31	25,09	18,56	5,93	24,49
	16	11	23,20	4,46	27,66	22,39	4,82	27,21	21,19	5,36	26,55	19,92	5,98	25,90
	18	13	24,81	4,49	29,30	23,88	4,88	28,76	22,64	5,41	28,05	21,33	6,03	27,36
MCW 022 C	10	5	20,34	4,91	25,25	19,63	5,26	24,89	18,50	5,84	24,34	17,31	6,48	23,79
	12	7	21,92	4,92	26,84	21,13	5,28	26,41	19,93	5,86	25,79	18,66	6,50	25,16
	14	9	23,61	4,90	28,51	22,70	5,31	28,01	21,43	5,89	27,32	20,10	6,54	26,64
	16	11	25,39	4,89	30,28	24,38	5,32	29,70	23,03	5,91	28,94	21,62	6,55	28,17
	18	13	27,24	4,88	32,12	26,12	5,34	31,46	24,70	5,92	30,62	23,19	6,58	29,77
MCW 027 C	10	5	25,01	6,31	31,32	24,22	6,72	30,94	22,83	7,48	30,31	21,38	8,32	29,70
	12	7	26,95	6,29	33,24	26,04	6,74	32,78	24,57	7,50	32,07	23,02	8,35	31,37
	14	9	28,97	6,28	35,25	27,95	6,76	34,71	26,40	7,52	33,92	24,78	8,37	33,15
	16	11	31,10	6,26	37,36	29,27	6,77	36,04	28,33	7,53	35,86	26,60	8,38	34,98
	18	13	33,37	6,24	39,61	32,07	6,78	38,85	30,35	7,54	37,89	28,51	8,40	36,91
MCW 031 C	10	5	29,04	7,22	36,26	27,96	7,80	35,76	26,36	8,68	35,04	24,65	9,70	34,35
	12	7	31,27	7,20	38,47	30,05	7,81	37,86	28,33	8,71	37,04	26,55	9,72	36,27
	14	9	33,60	7,19	40,79	32,24	7,84	40,08	30,43	8,72	39,15	28,53	9,73	38,26
	16	11	36,05	7,16	43,21	34,53	7,85	42,38	32,63	8,73	41,36	30,61	9,75	40,36
	18	13	38,65	7,13	45,78	36,93	7,86	44,79	34,94	8,74	43,68	32,80	9,75	42,55
MCW 039 C	10	5	35,99	8,89	44,88	34,59	9,65	44,24	32,69	10,73	43,42	30,71	11,96	42,67
	12	7	38,76	8,90	47,66	37,16	9,71	46,87	35,16	10,79	45,95	33,05	12,01	45,06
	14	9	41,66	8,91	50,57	39,88	9,77	49,65	37,75	10,85	48,60	35,52	12,07	47,59
	16	11	44,70	8,93	53,63	42,75	9,82	52,57	40,48	10,90	51,38	38,10	12,13	50,23
	18	13	47,98	8,94	56,92	45,74	9,88	55,62	43,36	10,96	54,32	40,83	12,19	53,02

10 MCW H COOLING CAPACITY

Legend:

- Twe₁** Evaporator water inlet temperature (user side)
- Twe₂** Evaporator water outlet temperature (user side)
- Twc₂** Condenser water outlet temperature (dissipator side)
- PF** Cooling capacity
- PA** Absorbed power input
- PD** Capacity at condenser

MCW H	Twc2	°C	30			35			40			45		
	Twe1	Twe2	PF	PA	PD	PF	PA	PD	PF	PA	PD	PF	PA	PD
	°C	°C	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
MCW 005 HM	10	5	4,90	1,33	6,23	4,81	1,48	6,29	4,60	1,66	6,26	4,27	1,85	6,12
	12	7	5,29	1,33	6,62	5,19	1,48	6,67	4,95	1,66	6,61	4,58	1,85	6,43
	14	9	5,75	1,33	7,08	5,58	1,48	7,06	5,28	1,66	6,94	4,92	1,85	6,77
	16	11	6,26	1,32	7,58	5,97	1,48	7,45	5,64	1,66	7,30	5,28	1,84	7,12
	18	13	6,77	1,32	8,09	6,39	1,47	7,86	6,02	1,65	7,67	5,66	1,84	7,50
MCW 005 H	10	5	5,31	1,31	6,62	4,67	1,47	6,14	4,41	1,65	6,06	4,11	1,85	5,96
	12	7	4,92	1,31	6,23	5,04	1,47	6,51	4,75	1,65	6,40	4,44	1,86	6,30
	14	9	5,69	1,31	7,00	5,41	1,47	6,88	5,10	1,65	6,75	4,80	1,86	6,66
	16	11	6,09	1,31	7,40	5,80	1,47	7,27	5,51	1,65	7,16	5,18	1,84	7,02
	18	13	6,51	1,30	7,81	6,22	1,46	7,68	5,89	1,64	7,53	5,55	1,84	7,39
MCW 007 HM	10	5	6,23	1,80	8,03	5,86	2,01	7,87	5,50	2,25	7,75	5,12	2,50	7,62
	12	7	6,69	1,80	8,49	6,30	2,01	8,31	5,91	2,26	8,17	5,51	2,50	8,01
	14	9	7,17	1,80	8,97	6,77	2,01	8,78	6,36	2,25	8,61	5,96	2,49	8,45
	16	11	7,69	1,79	9,48	7,27	2,00	9,27	6,85	2,24	9,09	6,42	2,47	8,89
	18	13	8,22	1,79	10,01	7,77	2,00	9,77	7,35	2,22	9,57	6,90	2,45	9,35
MCW 007 H	10	5	6,69	1,76	8,45	5,88	1,97	7,85	5,53	2,21	7,74	5,12	2,49	7,61
	12	7	6,22	1,75	7,97	6,34	1,98	8,32	5,95	2,22	8,17	5,54	2,49	8,03
	14	9	7,18	1,76	8,94	6,82	1,98	8,80	6,41	2,22	8,63	5,99	2,49	8,48
	16	11	7,73	1,76	9,49	7,33	1,97	9,30	6,91	2,22	9,13	6,45	2,48	8,93
	18	13	8,25	1,75	10,00	7,84	1,97	9,81	7,40	2,20	9,60	6,92	2,48	9,40
MCW 010 HM	10	5	8,88	2,40	11,28	8,39	2,67	11,06	7,86	3,00	10,86	7,30	3,37	10,67
	12	7	9,53	2,39	11,92	9,01	2,67	11,68	8,43	3,00	11,43	7,86	3,38	11,24
	14	9	10,19	2,39	12,58	9,64	2,67	12,31	9,07	2,99	12,06	8,46	3,36	11,82
	16	11	10,93	2,38	13,31	10,33	2,67	13,00	9,73	2,98	12,71	9,08	3,36	12,44
	18	13	11,65	2,38	14,03	11,06	2,66	13,72	10,40	2,98	13,38	9,73	3,34	13,07
MCW 010 H	10	5	9,52	2,34	11,86	8,39	2,63	11,02	7,88	2,96	10,84	7,34	3,32	10,66
	12	7	8,84	2,34	11,18	9,03	2,63	11,66	8,52	2,95	11,47	7,94	3,32	11,26
	14	9	10,21	2,34	12,55	9,70	2,63	12,33	9,14	2,96	12,10	8,53	3,32	11,85
	16	11	10,92	2,33	13,25	10,39	2,63	13,02	9,81	2,96	12,77	9,19	3,31	12,50
	18	13	11,64	2,33	13,97	11,08	2,63	13,71	10,50	2,95	13,45	9,83	3,31	13,14
MCW 012 H	10	5	11,58	2,88	14,46	10,24	3,20	13,44	9,64	3,56	13,20	9,00	3,96	12,96
	12	7	10,80	2,88	13,68	10,98	3,20	14,18	10,35	3,57	13,92	9,67	3,98	13,65
	14	9	12,40	2,87	15,27	11,77	3,20	14,97	11,10	3,56	14,66	10,39	3,98	14,37
	16	11	13,26	2,86	16,12	12,61	3,20	15,81	11,92	3,56	15,48	11,16	3,98	15,14
	18	13	14,12	2,85	16,97	13,47	3,18	16,65	12,73	3,56	16,29	11,99	3,97	15,96

10 MCW H COOLING CAPACITY

Legend:

- Twe₁** Evaporator water inlet temperature (user side)
- Twe₂** Evaporator water outlet temperature (user side)
- Twc₂** Condenser water outlet temperature (dissipator side)
- PF** Cooling capacity
- PA** Absorbed power input
- PD** Capacity at condenser

MCW H	Twc2	°C	30			35			40			45		
	Twe1	Twe2	PF	PA	PD	PF	PA	PD	PF	PA	PD	PF	PA	PD
	°C	°C	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
MCW 015 H	10	5	14,34	3,47	17,81	12,60	3,81	16,41	11,84	4,24	16,08	11,06	4,70	15,76
	12	7	13,34	3,43	16,77	13,59	3,85	17,44	12,79	4,28	17,07	11,95	4,74	16,69
	14	9	15,43	3,52	18,95	14,63	3,89	18,52	13,78	4,32	18,10	12,90	4,78	17,68
	16	11	16,56	3,56	20,12	15,71	3,94	19,65	14,81	4,36	19,17	13,89	4,82	18,71
	18	13	17,71	3,61	21,32	16,82	3,98	20,80	15,87	4,40	20,27	14,89	4,87	19,76
MCW 018 H	10	5	16,96	4,06	21,02	14,89	4,48	19,37	14,05	4,99	19,04	13,18	5,55	18,73
	12	7	15,73	4,02	19,75	16,02	4,51	20,53	15,09	5,02	20,11	14,15	5,59	19,74
	14	9	18,21	4,09	22,30	17,18	4,54	21,72	16,16	5,05	21,21	15,17	5,62	20,79
	16	11	19,48	4,12	23,60	18,39	4,58	22,97	17,31	5,09	22,40	16,27	5,65	21,92
	18	13	20,75	4,15	24,90	19,63	4,60	24,23	18,50	5,12	23,62	17,37	5,69	23,06
MCW 020 H	10	5	19,84	4,53	24,37	17,52	4,99	22,51	16,48	5,57	22,05	15,35	6,24	21,59
	12	7	18,51	4,47	22,98	18,81	5,04	23,85	17,71	5,62	23,33	16,53	6,28	22,81
	14	9	21,26	4,58	25,84	20,18	5,09	25,27	19,02	5,67	24,69	17,78	6,34	24,12
	16	11	22,73	4,64	27,37	21,59	5,15	26,74	20,37	5,73	26,10	19,10	6,40	25,50
	18	13	24,23	4,71	28,94	23,04	5,22	28,26	21,76	5,80	27,56	20,42	6,47	26,89
MCW 022 H	10	5	20,83	5,10	25,93	18,32	5,60	23,92	17,21	6,21	23,42	16,04	6,88	22,92
	12	7	19,35	5,06	24,41	19,73	5,64	25,37	18,54	6,25	24,79	17,29	6,92	24,21
	14	9	22,34	5,13	27,47	21,16	5,68	26,84	19,93	6,29	26,22	18,59	6,97	25,56
	16	11	23,95	5,15	29,10	22,69	5,71	28,40	21,40	6,32	27,72	19,97	7,00	26,97
	18	13	25,64	5,18	30,82	24,33	5,73	30,06	22,93	6,36	29,29	21,46	7,04	28,50
MCW 027 H	10	5	25,74	6,49	32,23	22,67	7,17	29,84	21,32	7,96	29,28	19,86	8,86	28,72
	12	7	23,98	6,45	30,43	24,37	7,20	31,57	22,91	8,00	30,91	21,41	8,89	30,30
	14	9	27,60	6,52	34,12	26,15	7,24	33,39	24,63	8,04	32,67	23,00	8,93	31,93
	16	11	29,53	6,55	36,08	28,02	7,21	35,23	26,41	8,07	34,48	24,67	8,97	33,64
	18	13	31,58	6,57	38,15	29,99	7,29	37,28	28,27	8,09	36,36	26,46	8,99	35,45
MCW 031 H	10	5	29,62	7,55	37,17	26,10	8,35	34,45	24,54	9,29	33,83	22,83	10,39	33,22
	12	7	27,60	7,51	35,11	28,03	8,38	36,41	26,36	9,34	35,70	24,57	10,42	34,99
	14	9	31,74	7,58	39,32	30,07	8,42	38,49	28,30	9,36	37,66	26,43	10,44	36,87
	16	11	33,96	7,61	41,57	32,19	8,45	40,64	30,31	9,40	39,71	28,33	10,47	38,80
	18	13	36,29	7,64	43,93	34,42	8,48	42,90	32,45	9,42	41,87	30,34	10,49	40,83
MCW 039 H	10	5	36,55	9,40	45,95	32,29	10,34	42,63	30,41	11,49	41,90	28,48	12,80	41,28
	12	7	34,05	9,32	43,37	34,65	10,42	45,07	32,68	11,57	44,25	30,64	12,88	43,52
	14	9	39,16	9,47	48,63	37,15	10,50	47,65	35,06	11,66	46,72	32,90	12,96	45,86
	16	11	41,90	9,56	51,46	39,79	10,59	50,38	37,58	11,74	49,32	35,29	13,03	48,32
	18	13	44,81	9,64	54,45	42,56	10,67	53,23	40,24	11,81	52,05	37,80	13,12	50,92

11 MCW H HEATING CAPACITY

Legend:

- Twc₁** Condenser water inlet temperature (user side)
- Twc₂** Condenser water outlet temperature (user side)
- Twe₂** Evaporator water outlet temperature (dissipator side)
- PT** Heating capacity
- PA** Absorbed power input

MCW H	Twe2		8°C		9°C		10°C		11°C		12°C	
	Twc1	Twc2	PT	PA	PT	PA	PT	PA	PT	PA	PT	PA
	°C	°C	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
MCW 005 HM	35	30	5,99	1,34	6,16	1,34	6,34	1,34	6,52	1,34	6,71	1,33
	40	35	5,88	1,50	6,03	1,50	6,19	1,50	6,36	1,50	6,53	1,50
	45	40	5,70	1,67	5,86	1,67	6,02	1,67	6,18	1,67	6,33	1,67
	50	45	5,55	1,84	5,69	1,84	5,84	1,84	6,01	1,83	6,16	1,83
MCW 005 H	35	30	5,83	1,30	6,00	1,31	6,18	1,30	6,35	1,30	6,55	1,30
	40	35	5,70	1,46	5,86	1,47	6,05	1,46	6,22	1,46	6,39	1,46
	45	40	5,58	1,64	5,74	1,65	5,90	1,64	6,07	1,63	6,22	1,64
	50	45	5,45	1,84	5,59	1,84	5,74	1,84	5,91	1,83	6,05	1,83
MCW 007 HM	35	30	7,74	1,78	7,96	1,78	8,19	1,77	8,42	1,77	8,65	1,76
	40	35	7,54	1,98	7,75	1,98	7,97	1,98	8,21	1,98	8,44	1,97
	45	40	7,35	2,20	7,55	2,19	7,75	2,19	7,98	2,18	8,20	2,17
	50	45	7,14	2,41	7,33	2,40	7,54	2,39	7,76	2,38	7,99	2,37
MCW 007 H	35	30	7,57	1,69	7,78	1,70	8,01	1,69	8,24	1,69	8,47	1,69
	40	35	7,37	1,90	7,58	1,90	7,81	1,90	8,04	1,90	8,26	1,90
	45	40	7,20	2,13	7,40	2,14	7,60	2,14	7,81	2,13	8,03	2,12
	50	45	7,01	2,39	7,21	2,39	7,41	2,39	7,61	2,38	7,81	2,37
MCW 010 HM	35	30	10,79	2,35	11,09	2,35	11,40	2,35	11,74	2,35	12,08	2,34
	40	35	10,51	2,64	10,81	2,63	11,12	2,63	11,42	2,63	11,73	2,63
	45	40	10,25	2,96	10,53	2,96	10,80	2,96	11,11	2,96	11,40	2,95
	50	45	10,02	3,35	10,27	3,35	10,55	3,35	10,83	3,34	11,11	3,33
MCW 010 H	35	30	10,54	2,29	10,84	2,29	11,16	2,29	11,47	2,29	11,78	2,29
	40	35	10,29	2,57	10,57	2,58	10,89	2,58	11,18	2,58	11,49	2,57
	45	40	10,03	2,90	10,30	2,90	10,60	2,90	10,89	2,89	11,18	2,89
	50	45	9,77	3,25	10,04	3,26	10,31	3,24	10,58	3,24	10,84	3,24
MCW 012 H	35	30	13,04	2,79	13,40	2,79	13,77	2,79	14,17	2,79	14,56	2,78
	40	35	12,72	3,11	13,07	3,11	13,43	3,10	13,82	3,10	14,20	3,10
	45	40	12,41	3,46	12,74	3,47	13,10	3,47	13,46	3,47	13,84	3,46
	50	45	12,12	3,88	12,45	3,89	12,77	3,88	13,11	3,88	13,48	3,89

11 MCW H HEATING CAPACITY

Legend:

- Twc₁** Condenser water inlet temperature (user side)
- Twe₂** Condenser water outlet temperature (user side)
- Twc₂** Evaporator water outlet temperature (dissipator side)
- PT** Heating capacity
- PA** Absorbed power input

MCW H	Twe2		8°C		9°C		10°C		11°C		12°C	
	Twc1	Twc2	PT	PA	PT	PA	PT	PA	PT	PA	PT	PA
	°C	°C	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
MCW 015 H	35	30	15,91	3,45	16,42	3,47	16,93	3,49	17,44	3,51	17,97	3,53
	40	35	15,49	3,82	15,97	3,84	16,46	3,86	16,95	3,88	17,44	3,90
	45	40	15,08	4,24	15,53	4,26	16,00	4,28	16,47	4,29	16,94	4,31
	50	45	14,67	4,69	15,11	4,71	15,55	4,73	15,99	4,76	16,46	4,77
MCW 018 H	35	30	19,13	3,95	19,68	3,96	20,24	3,98	20,83	3,99	21,42	4,00
	40	35	18,63	4,39	19,14	4,40	19,69	4,42	20,24	4,44	20,81	4,44
	45	40	18,18	4,89	18,68	4,90	19,20	4,91	19,72	4,92	20,26	4,94
	50	45	17,84	5,42	18,30	5,44	18,80	5,45	19,27	5,47	19,77	5,48
MCW 020 H	35	30	21,52	4,38	22,16	4,40	22,82	4,43	23,47	4,46	24,16	4,48
	40	35	20,97	4,88	21,58	4,90	22,21	4,93	22,84	4,96	23,51	4,99
	45	40	20,40	5,46	21,00	5,48	21,60	5,50	22,23	5,53	22,88	5,57
	50	45	19,86	6,11	20,42	6,14	20,99	6,17	21,62	6,19	22,26	6,23
MCW 022 H	35	30	23,58	5,02	24,27	5,04	25,00	5,05	25,73	5,07	26,49	5,08
	40	35	22,94	5,56	23,62	5,58	24,30	5,59	25,02	5,61	25,72	5,62
	45	40	22,31	6,16	22,92	6,19	23,59	6,20	24,24	6,22	24,93	6,24
	50	45	21,65	6,83	22,25	6,85	22,87	6,87	23,49	6,89	24,12	6,90
MCW 027 H	35	30	28,99	6,38	29,84	6,39	30,71	6,40	31,60	6,41	32,50	6,43
	40	35	28,22	7,08	29,04	7,10	29,85	7,11	30,72	7,12	31,56	7,14
	45	40	27,43	7,88	28,21	7,89	29,00	7,90	29,79	7,92	30,62	7,93
	50	45	26,67	8,77	27,39	8,79	28,12	8,80	28,88	8,81	29,66	8,83
MCW 031 H	35	30	33,59	7,31	34,55	7,32	35,55	7,33	36,54	7,35	37,59	7,36
	40	35	32,70	8,13	33,64	8,14	34,58	8,16	35,54	8,18	36,55	8,19
	45	40	31,84	9,07	32,73	9,08	33,60	9,10	34,52	9,11	35,45	9,12
	50	45	31,00	10,14	31,83	10,14	32,63	10,16	33,49	10,16	34,37	10,16
MCW 039 H	35	30	41,38	9,01	42,59	9,05	43,83	9,08	45,09	9,12	46,39	9,15
	40	35	40,41	10,00	41,56	10,04	42,76	10,07	43,95	10,11	45,20	10,15
	45	40	39,48	11,12	40,58	11,17	41,70	11,20	42,85	11,23	44,03	11,27
	50	45	38,64	12,40	39,65	12,43	40,69	12,46	41,78	12,49	42,89	12,51

12 MCR C COOLING CAPACITY

Legend:

- Twe₁** Evaporator water inlet temperature (user side)
- Twe₂** Evaporator water outlet temperature (user side)
- Twc₂** Condenser water outlet temperature (dissipator side)
- PF** Cooling capacity
- PA** Absorbed power input
- PD** Capacity at condenser

MCR C	Twc2	°C	25			30			35			40			45		
	Twe1	Twe2	PF	PA	PD	PF	PA	PD	PF	PA	PD	PF	PA	PD	PF	PA	PD
	°C	°C	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
MCR 005 CM	10	5	4,82	1,28	6,10	4,74	1,44	6,18	4,49	1,62	6,11	4,16	1,80	5,96	3,85	1,98	5,83
	12	7	5,23	1,27	6,50	5,09	1,46	6,55	4,80	1,63	6,43	4,46	1,81	6,27	4,14	1,99	6,13
	14	9	5,69	1,26	6,95	5,45	1,47	6,92	5,10	1,64	6,74	4,77	1,82	6,59	4,43	2,00	6,43
	16	11	6,23	1,24	7,47	5,81	1,47	7,28	5,44	1,66	7,10	5,11	1,83	6,94	4,75	2,00	6,75
	18	13	6,78	1,23	8,01	6,14	1,48	7,62	5,79	1,66	7,45	5,42	1,84	7,26	5,06	2,01	7,07
MCR 005 C	10	5	5,03	1,25	6,28	4,75	1,42	6,17	4,46	1,59	6,05	4,16	1,79	5,95	3,85	2,01	5,86
	12	7	5,43	1,24	6,67	5,10	1,43	6,53	4,80	1,60	6,40	4,49	1,81	6,30	4,16	2,03	6,19
	14	9	5,85	1,23	7,08	5,46	1,44	6,90	5,15	1,62	6,77	4,82	1,82	6,64	4,47	2,04	6,51
	16	11	6,27	1,22	7,49	5,83	1,45	7,28	5,52	1,63	7,15	5,17	1,83	7,00	4,78	2,05	6,83
	18	13	6,72	1,21	7,93	6,21	1,46	7,67	5,88	1,64	7,52	5,50	1,84	7,34	5,08	2,05	7,13
MCR 007 CM	10	5	6,85	1,58	8,43	6,20	1,91	8,11	5,81	2,14	7,95	5,40	2,36	7,76	5,00	2,58	7,58
	12	7	7,40	1,57	8,97	6,63	1,93	8,56	6,20	2,16	8,36	5,77	2,37	8,14	5,35	2,90	8,25
	14	9	7,52	1,75	9,27	7,08	1,95	9,03	6,64	2,17	8,81	6,19	2,38	8,57	5,76	2,59	8,35
	16	11	8,02	1,76	9,78	7,57	1,96	9,53	7,11	2,18	9,29	6,65	2,39	9,04	6,19	2,59	8,78
	18	13	8,52	1,78	10,30	8,06	1,98	10,04	7,59	2,19	9,78	7,12	2,39	9,51	6,64	2,59	9,23
MCR 007 C	10	5	6,79	1,52	8,31	6,20	1,84	8,04	5,78	2,07	7,85	5,36	2,32	7,68	4,92	2,60	7,52
	12	7	7,34	1,51	8,85	6,64	1,87	8,51	6,20	2,10	8,30	5,76	2,35	8,11	5,30	2,63	7,93
	14	9	7,52	1,69	9,21	7,10	1,89	8,99	6,64	2,12	8,76	6,17	2,38	8,55	5,71	2,64	8,35
	16	11	8,02	1,71	9,73	7,58	1,91	9,49	7,10	2,14	9,24	6,59	2,40	8,99	6,12	2,66	8,78
	18	13	8,54	1,72	10,26	8,07	1,93	10,00	7,55	2,16	9,71	7,02	2,42	9,44	6,52	2,67	9,19
MCR 010 CM	10	5	9,23	2,28	11,51	8,60	2,61	11,21	8,03	2,93	10,96	7,44	3,31	10,75	6,85	3,76	10,61
	12	7	9,92	2,26	12,18	9,18	2,64	11,82	8,60	2,96	11,56	7,99	3,34	11,33	7,36	3,78	11,14
	14	9	10,65	2,25	12,90	9,78	2,66	12,44	9,19	2,98	12,17	8,53	3,36	11,89	7,88	3,82	11,70
	16	11	11,45	2,22	13,67	10,44	2,68	13,12	9,79	3,01	12,80	9,12	3,39	12,51	8,42	3,83	12,25
	18	13	12,26	2,20	14,46	11,10	2,70	13,80	10,41	3,03	13,44	9,70	3,42	13,12	8,98	3,84	12,82
MCR 010 C	10	5	9,10	2,22	11,32	8,54	2,55	11,09	8,02	2,87	10,89	7,45	3,23	10,68	6,85	3,64	10,49
	12	7	9,82	2,21	12,03	9,17	2,58	11,75	8,60	2,90	11,50	8,01	3,27	11,28	7,37	3,68	11,05
	14	9	10,57	2,19	12,76	9,80	2,61	12,41	9,21	2,93	12,14	8,58	3,30	11,88	7,91	3,47	11,38
	16	11	11,32	2,17	13,49	10,43	2,63	13,06	9,81	2,96	12,77	9,16	3,32	12,48	8,46	3,72	12,18
	18	13	12,10	2,15	14,25	11,08	2,66	13,74	10,44	2,98	13,42	9,74	3,35	13,09	9,01	3,74	12,75
MCR 012 C	10	5	11,76	2,59	14,35	10,74	3,11	13,85	10,07	3,46	13,53	9,37	3,86	13,23	8,66	4,32	12,98
	12	7	12,65	2,57	15,22	11,48	3,14	14,62	10,76	3,50	14,26	10,01	3,91	13,92	9,25	4,36	13,61
	14	9	12,92	2,84	15,76	12,23	3,18	15,41	11,48	3,54	15,02	10,68	3,96	14,64	9,89	4,40	14,29
	16	11	13,74	2,88	16,62	13,01	3,21	16,22	12,24	3,59	15,83	11,40	4,01	15,41	10,56	4,45	15,01
	18	13	14,61	2,90	17,51	13,83	3,24	17,07	13,00	3,63	16,63	12,13	4,07	16,20	11,26	4,49	15,75

12 MCR C COOLING CAPACITY

Legend:

- Twe₁** Evaporator water inlet temperature (user side)
- Twe₂** Evaporator water outlet temperature (user side)
- Twc₂** Condenser water outlet temperature (dissipator side)
- PF** Cooling capacity
- PA** Absorbed power input
- PD** Capacity at condenser

MCR C	Twc2	°C	25			30			35			40			45		
	Twe1	Twe2	PF	PA	PD	PF	PA	PD	PF	PA	PD	PF	PA	PD	PF	PA	PD
	°C	°C	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
MCR 015 C	10	5	13,72	3,37	17,09	12,88	3,80	16,68	12,26	4,14	16,40	11,28	4,70	15,98	10,47	5,21	15,68
	12	7	14,82	3,39	18,21	13,84	3,87	17,71	13,00	4,30	17,30	12,14	4,78	16,92	11,26	5,29	16,55
	14	9	15,97	3,41	19,38	14,83	3,95	18,78	13,94	4,39	18,33	13,02	4,87	17,89	12,09	5,39	17,48
	16	11	17,22	3,44	20,66	15,83	4,03	19,86	14,89	4,47	19,36	13,91	4,95	18,86	12,93	5,48	18,41
	18	13	18,45	3,47	21,92	16,86	4,11	20,97	15,85	4,55	20,40	14,82	5,04	19,86	14,00	5,47	19,47
MCR 018 C	10	5	16,87	3,75	20,62	15,52	4,41	19,93	14,60	4,91	19,51	13,67	5,48	19,15	12,73	6,10	18,83
	12	7	18,24	3,75	21,99	16,60	4,49	21,09	15,60	5,00	20,60	14,60	5,57	20,17	13,63	6,19	19,82
	14	9	19,69	3,76	23,45	17,71	4,56	22,27	16,62	5,08	21,70	15,57	5,66	21,23	14,55	6,28	20,83
	16	11	19,98	4,18	24,16	18,82	4,64	23,46	17,70	5,17	22,87	16,58	5,76	22,34	15,47	6,36	21,83
	18	13	21,18	4,26	25,44	19,96	4,73	24,69	18,75	5,26	24,01	17,57	5,85	23,42	16,37	6,44	22,81
MCR 020 C	10	5	18,78	4,29	23,07	17,53	4,94	22,47	16,48	5,51	21,99	15,32	6,18	21,50	14,14	6,93	21,07
	12	7	20,20	4,31	24,51	18,73	5,02	23,75	17,60	5,60	23,20	16,37	6,28	22,65	15,11	7,04	22,15
	14	9	21,69	4,33	26,02	19,98	5,13	25,11	18,79	5,72	24,51	17,52	6,39	23,91	16,19	7,16	23,35
	16	11	23,29	4,36	27,65	21,27	5,23	26,50	20,06	5,82	25,88	18,73	6,51	25,24	17,36	7,28	24,64
	18	13	23,83	4,82	28,65	22,59	5,34	27,93	21,27	5,95	27,22	19,93	6,65	26,58	18,51	7,42	25,93
MCR 022 C	10	5	20,77	4,73	25,50	19,09	5,52	24,61	17,94	6,11	24,05	16,70	6,77	23,47	15,38	7,50	22,88
	12	7	22,43	4,73	27,16	20,47	5,59	26,06	19,20	6,20	25,40	17,86	6,87	24,73	16,50	7,60	24,10
	14	9	24,13	4,72	28,85	21,89	5,64	27,53	20,52	6,30	26,82	19,07	6,98	26,05	17,63	7,72	25,35
	16	11	24,64	5,22	29,86	23,27	5,79	29,06	21,90	6,40	28,30	20,34	7,10	27,44	18,76	7,83	26,59
	18	13	26,23	5,32	31,55	24,80	5,88	30,68	23,28	6,51	29,79	21,70	7,20	28,90	20,01	7,93	27,94
MCR 027 C	10	5	25,10	6,20	31,30	23,37	7,10	30,47	21,94	7,90	29,84	20,42	8,79	29,21	18,84	9,80	28,64
	12	7	27,08	6,19	33,27	25,01	7,20	32,21	23,50	8,00	31,50	21,87	8,91	30,78	20,17	9,92	30,09
	14	9	29,10	6,17	35,27	26,73	7,30	34,03	25,08	8,12	33,20	23,36	9,03	32,39	21,57	10,04	31,61
	16	11	31,22	6,16	37,38	28,46	7,39	35,85	26,72	8,22	34,94	24,94	9,15	34,09	23,02	10,16	33,18
	18	13	32,04	6,75	38,79	30,30	7,50	37,80	28,44	8,34	36,78	26,52	9,26	35,78	24,50	10,28	34,78
MCR 031 C	10	5	29,97	6,75	36,72	27,27	8,05	35,32	25,59	8,98	34,57	23,75	10,04	33,79	21,84	11,23	33,07
	12	7	32,24	6,73	38,97	29,15	8,17	37,32	27,30	9,10	36,40	25,41	10,16	35,57	23,36	11,35	34,71
	14	9	32,91	7,44	40,35	31,10	8,29	39,39	29,12	9,24	38,36	27,03	10,32	37,35	24,92	11,48	36,40
	16	11	35,05	7,56	42,61	33,06	8,41	41,47	31,01	9,37	40,38	28,79	10,45	39,24	26,57	11,58	38,15
	18	13	37,24	7,68	44,92	35,40	8,55	43,95	32,98	9,50	42,48	30,59	10,58	41,17	28,26	11,68	39,94
MCR 039 C	10	5	35,89	8,71	44,60	33,62	9,91	43,53	31,66	11,03	42,69	29,64	12,31	41,95	27,64	13,76	41,40
	12	7	38,61	8,73	47,34	35,94	10,09	46,03	33,90	11,20	45,10	31,73	12,50	44,23	29,50	13,96	43,46
	14	9	41,57	8,74	50,31	38,34	10,24	48,58	36,14	11,38	47,52	33,92	12,68	46,60	31,58	14,12	45,70
	16	11	44,59	8,75	53,34	40,89	10,42	51,31	38,55	11,57	50,12	36,13	12,86	48,99	33,69	14,31	48,00
	18	13	45,83	9,56	55,39	46,44	10,60	57,04	41,04	11,77	52,81	38,52	13,09	51,61	35,90	14,49	50,39

13 OPERATING LIMITS

13.1 MCW OPERATING LIMITS

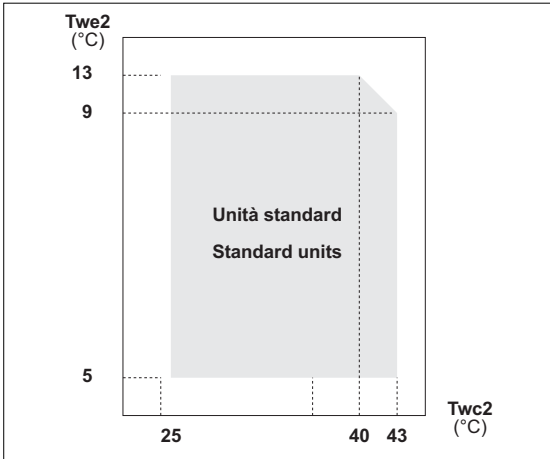
Supply voltage: $\pm 10\%$ of rated voltage.

The operating limits shown in the diagrams are valid for thermal differentials of water between 3 and 8°C

Legend:

Twe₂ Evaporator water outlet temperature

Twc₂ Condenser water outlet temperature



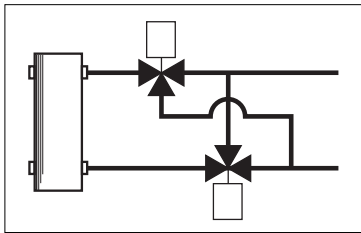
COOLING MODE

In order to work with outlet water temperatures on condenser side below 25 °C it is essential to install a condensation control device (optional).

The control works by modulating the water flow with a 2-way valve of pressostatic type or managed directly by the microprocessor control.

If the unit is to be operated with water temperature on condenser side above 43°C and/or used to cool fluids at temperatures (Twe₂) above 13°C, it will be necessary to rely on models with **R134a**, available on request, which raise the limit of the condenser outlet water temperature Twc₁ to + 60°C in continuous operation.

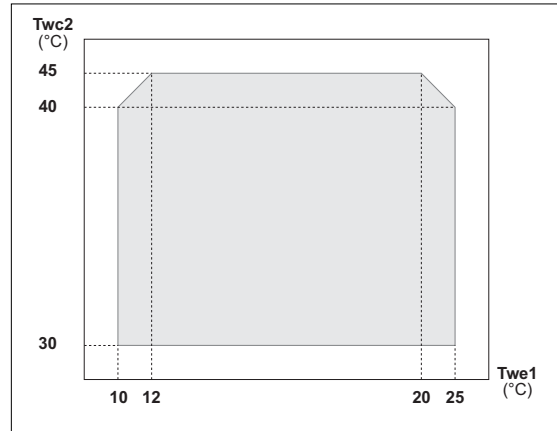
HEATING MODE



The heat pump units are set up so that the water exchanger is connected in reverse flow in the cooling mode. For installations where the temperatures of the water produced (Twc₂) exceed the values indicated, an exclusive water-side reverse cycle - which always maintains a reverse flow - and an **R134a** version are available on request (optional).

R134a is a high-boiling fluid characterised by low operating pressures; therefore, the volume of flow handled being equal, it requires higher capacity compressors (+60%) compared to **R407C** versions.

The limits indicated in the diagram are referring to a continuous running of the unit, without any use of water mixed with glycol in the source circuit. For cooling operation the reference should be the previous paragraph.



13.2 MCR OPERATING LIMITS

Supply voltage: $\pm 10\%$ of rated voltage.

The operating limits shown in the diagrams are valid for thermal differentials of water between 3 and 8°C

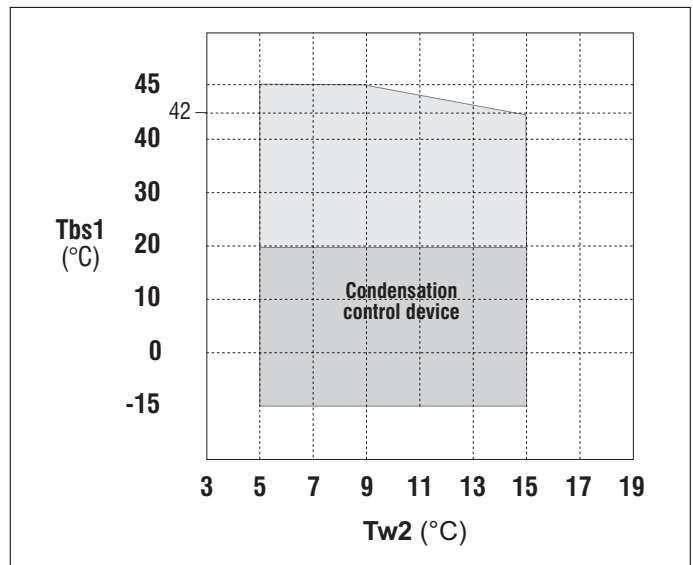
Legend:

Tbs₁ Outdoor temperature (dry bulb)

Tw₂ Outlet water temperature

COOLING MODE

In order to work with outdoor temperatures below 20 °C it is essential to install a condensation control device (optional). The control works by modulating the fan speed with a potentiometer and allows the unit to operated in the cooling mode with outdoor temperatures (Tbs1) as low as -15 °C



14 CALCULATION FACTORS

WATER TEMPERATURE DROP/RISE DIFFERENT THAN 5						
Water temperature drop/rise	3	4	5	6	7	8
Capacity correction factor	0,975	0,99	1	1,015	1,03	1,04
Power input correction factor	1	1	1	1	1	1
Water flow correction factor	1,63	1,24	1	0,85	0,74	0,65
Water pressure drop correction factor	2,64	1,53	1	0,72	0,54	0,42

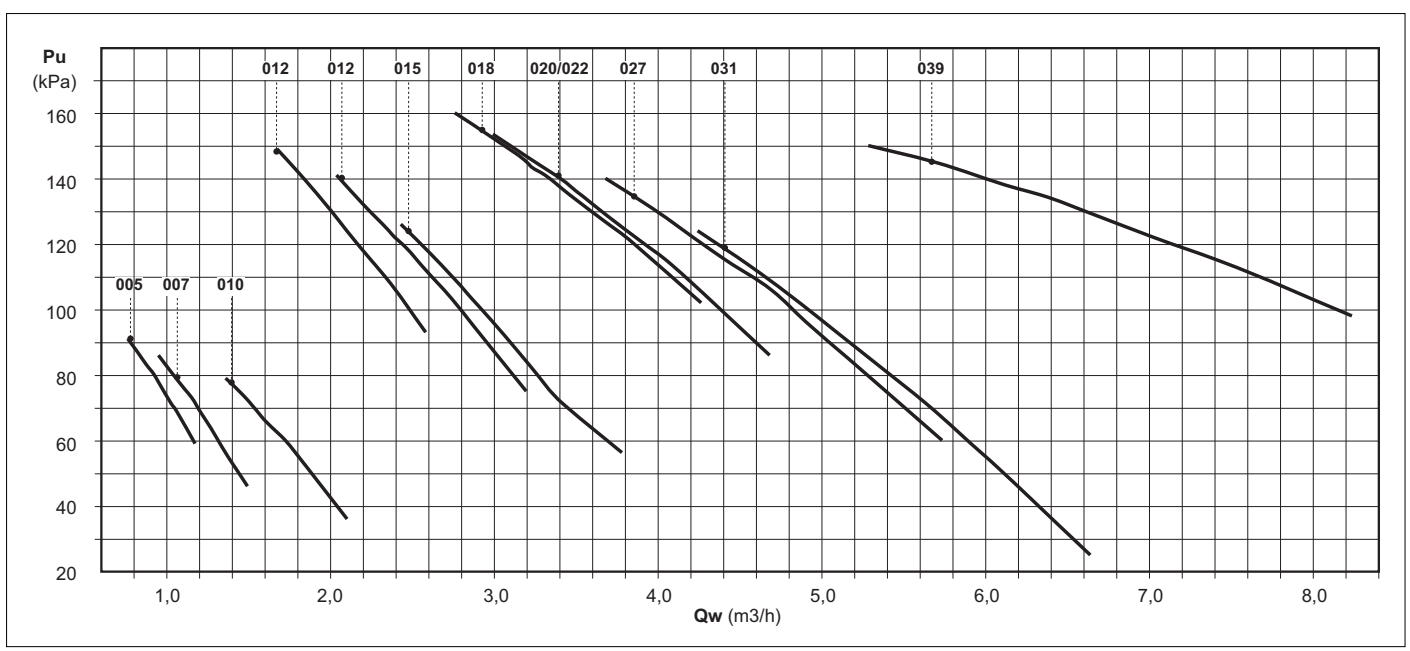
OPERATION WITH ETHYLEN GLYCOL AND WATER SOLUTION					
Percentage of glycol	0%	10%	20%	30%	40%
Minimum water outlet temperature	5°C	2°C	-5°C	-10°C	-15°C
Mixture freezing temperature (°C)	0°C	-4°C	-14°C	-18°C	-24°C
Capacity correction factor	1,000	0,998	0,994	0,989	0,983
Water flow correction factor	1,000	1,047	1,094	1,140	1,199
Water pressure drop correction factor	1,000	1,157	1,352	1,585	1,860

OPERATION WITH PROPYLEN GLYCOL AND WATER SOLUTION					
Percentage of glycol	0%	10%	20%	30%	40%
Minimum water outlet temperature	5°C	2°C	-5°C	-10°C	-15°C
Mixture freezing temperature (°C)	0°C	-4°C	-14°C	-18°C	-24°C
Capacity correction factor	1,000	0,996	0,985	0,971	0,960
Water flow correction factor	1,000	1,022	1,043	1,070	1,098
Water pressure drop correction factor	1,000	1,111	1,307	1,532	1,777

FOULING FACTORS				
Fouling factors (m ² °C / W)	0	4,4 x 10 ⁻⁵	8,8 x 10 ⁻⁵	17,6 x 10 ⁻⁵
Capacity correction factor	1,000	0,97	0,94	0,93
Power input correction factor	1,000	0,99	0,99	0,98

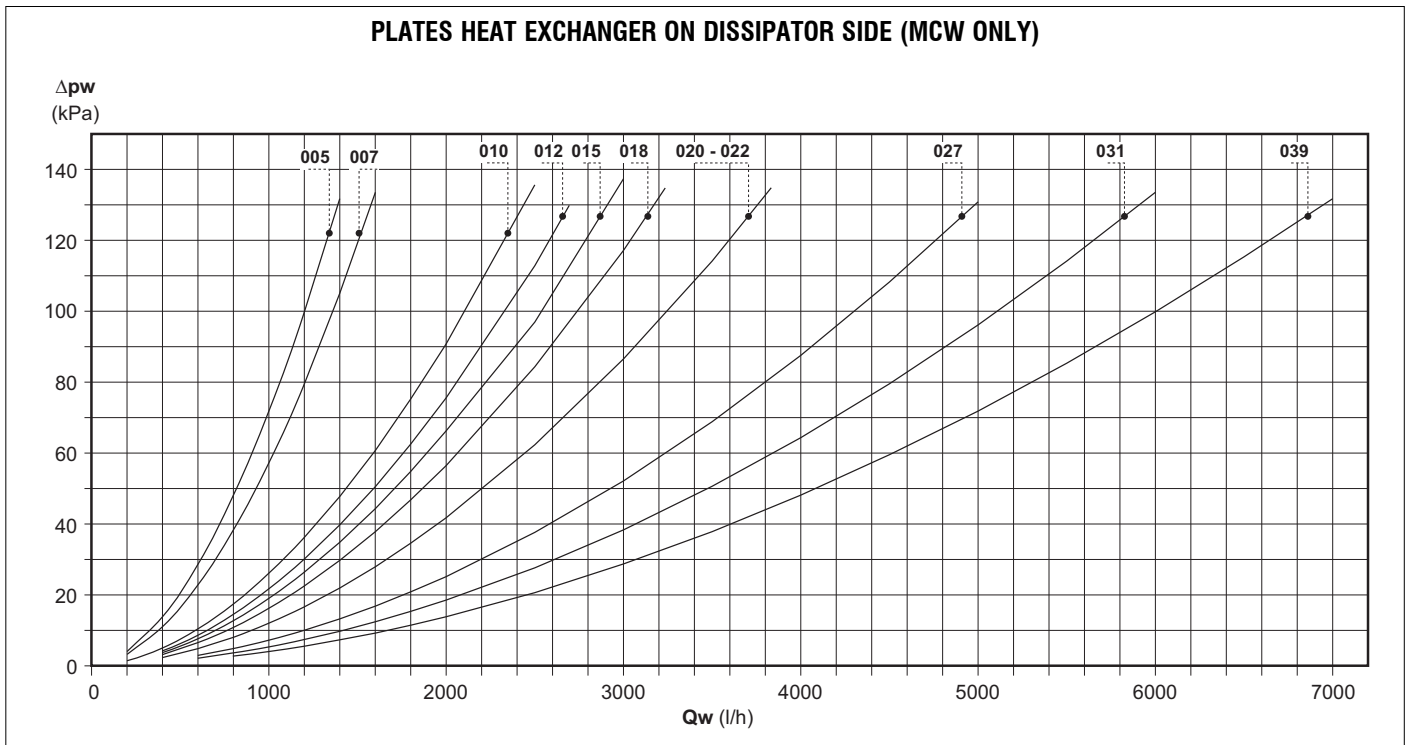
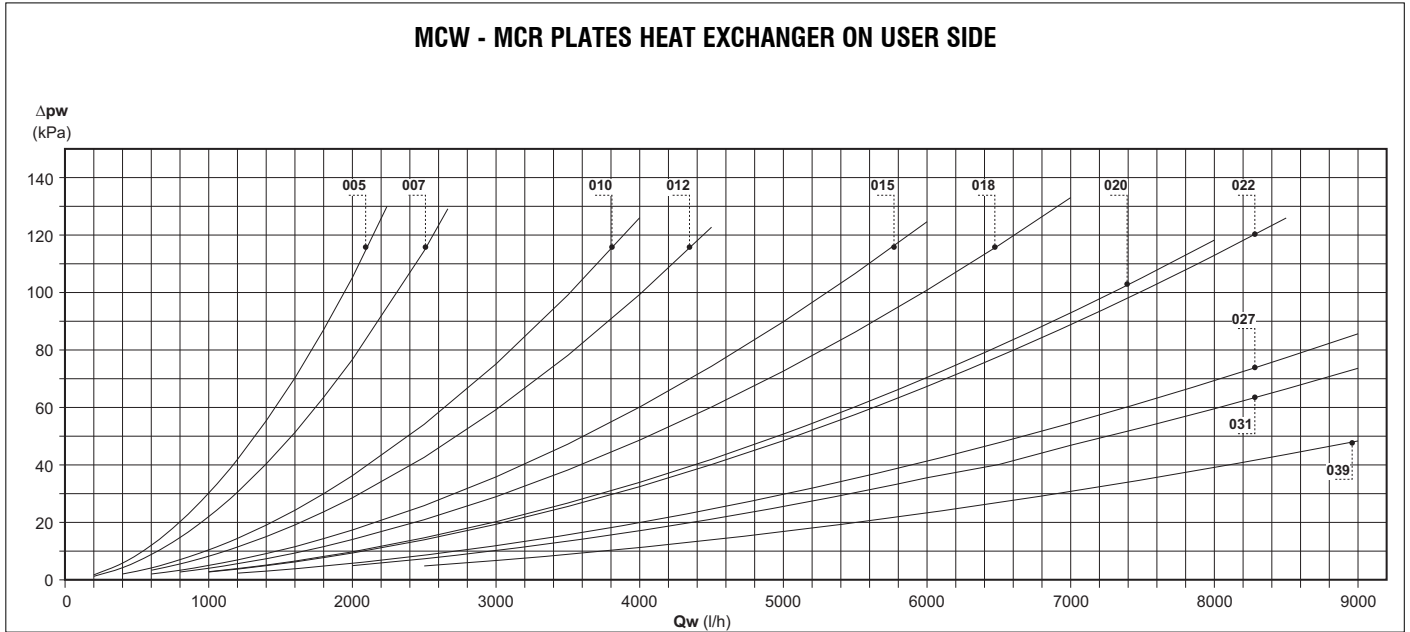
15 AVAILABLE HEAD PRESSURE OF THE PUMPS

In the diagram below mentioned you can read the available head pressure of the pumps corrected with the water pressure drop of the user side heat exchanger. The results are valid both for MCW units and for MCR units.



16 WATER PRESSURE DROPS

The diagram shows the pressure drops on the water side (Δp_w) as a function of the water flow rate (Q_w), assuming an average water temperature of 10°C



17 WATER CIRCUIT (USER SIDE)

When setting up the water circuit of the unit, it is advisable to follow the directions below and in any case comply with local or national regulations. Connect the pipes to the chiller using flexible couplings to prevent the transmission of vibrations and to compensate thermal expansions.

It is recommended to install the following components on the pipes:

- Temperature and pressure indicators for routine maintenance and monitoring of the unit.
Checking the pressure on the water side will enable you to verify whether the expansion tank is working efficiently and to promptly detect any water leaks within the equipment.
- Traps on incoming and outgoing pipes for temperature measurements, which can provide a direct reading of the operating temperatures.
- Regulating valves (gate valves) for isolating the unit from the water circuit.
- **Metal mesh filter (incoming pipes), with a mesh not to exceed 1 mm, to protect the exchanger from scale or impurities present in the pipes.**
- Air vent valves, to be placed at the highest points of the water circuit for the purpose of bleeding air.
(The internal pipes of the unit are fitted with small air vent valves for bleeding the unit itself: this operation may only be carried out when the unit is disconnected from the power supply).
- Drainage valve and, where necessary, a drainage tank for emptying out the equipment for maintenance purposes or when the unit is taken out of service at the end of the season.
(A 1" drainage valve is provided on the optional inertial storage reservoir: this operation may only be carried out when the unit is disconnected from the power supply).

It is of fundamental importance that the incoming water supply is hooked up to the connection marked "Water Inlet"

Otherwise the evaporator would be exposed to the risk of freezing since the antifreeze thermostat would not be able to perform its function; moreover the reverse cycle would not be respected in the cooling mode, resulting in additional risks of malfunctioning.

The water circuit must be set up in such a way as to guarantee that the nominal flow rate of the water supplied to the evaporator remains constant (+/- 15%) in all operating conditions.

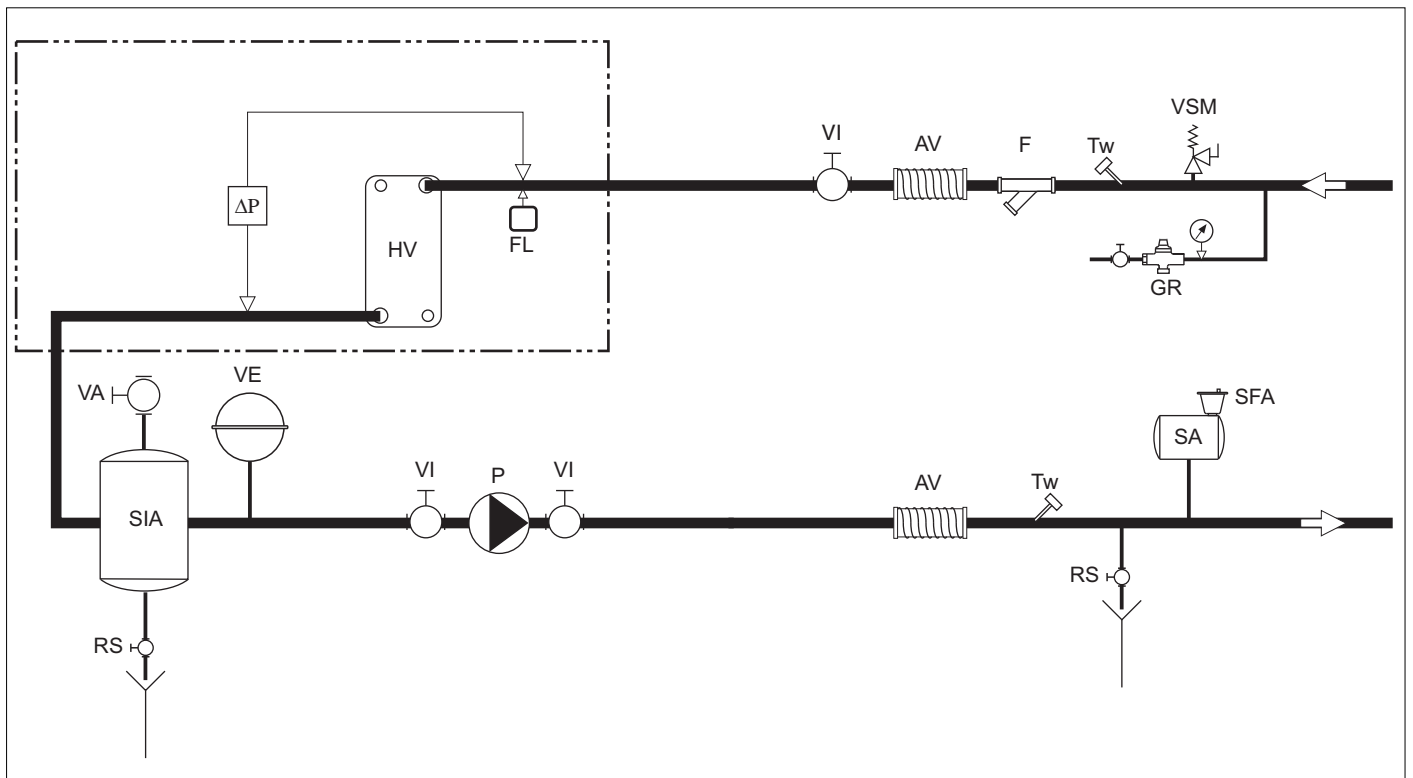
A standard feature of **MCW** and **MCR** units is a device for controlling the flow rate (differential pressure switch) in the water circuit in the immediate vicinity of the evaporator.

Any tampering with said device will immediately invalidate the warranty.

It is strongly recommended to install a safety valve in the water circuit. In the event of serious equipment faults (e.g. fire) it will enable water to be drained from the system, thereby preventing possible bursts.

Always connect the drain outlet to a pipe with a diameter at least as large as that of the valve opening and direct it toward an area where the discharge of water cannot harm people.

The plumbing diagram represents a typical water circuit to which an **MCW** and **MCR** unit is connected to a circulation pump and inertial storage reservoir.



Legend:

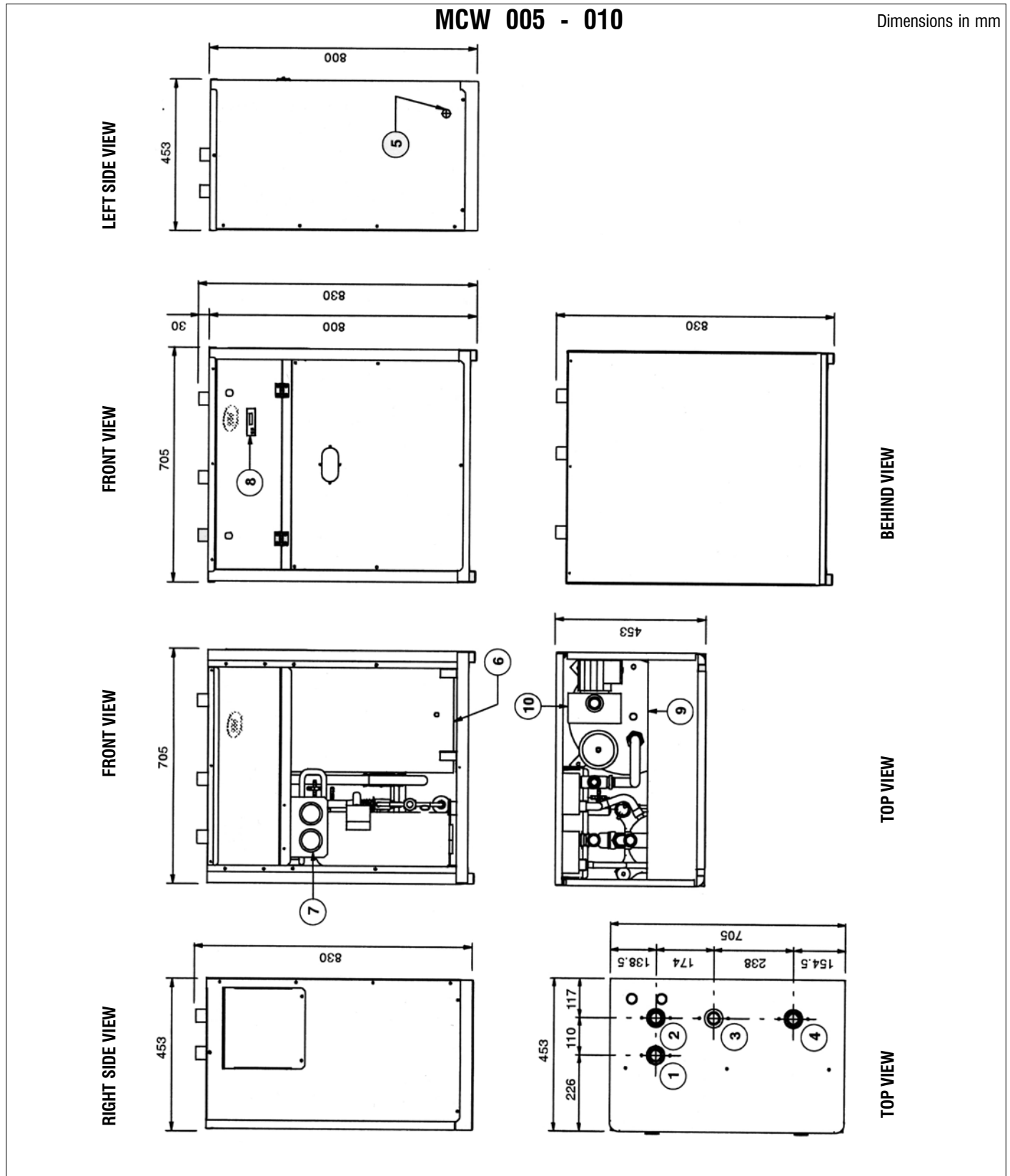
	DESCRIPTION
Dp	Differential pressure switch, water side
HV	Evaporator
FL	Flow switch
VE	Membrane expansion tank
VA	Manual air valve
SIA	Inertial water storage reservoir
RS	Emptying tap
VI	Regulating valve

Legend:

	DESCRIPTION
P	Circulation pump
AV	Vibration damper
F	Metal filter
VSM	Spring-activated safety valve
GR	Filling unit
SA	Air separator
TW	Trap for reading water temperature

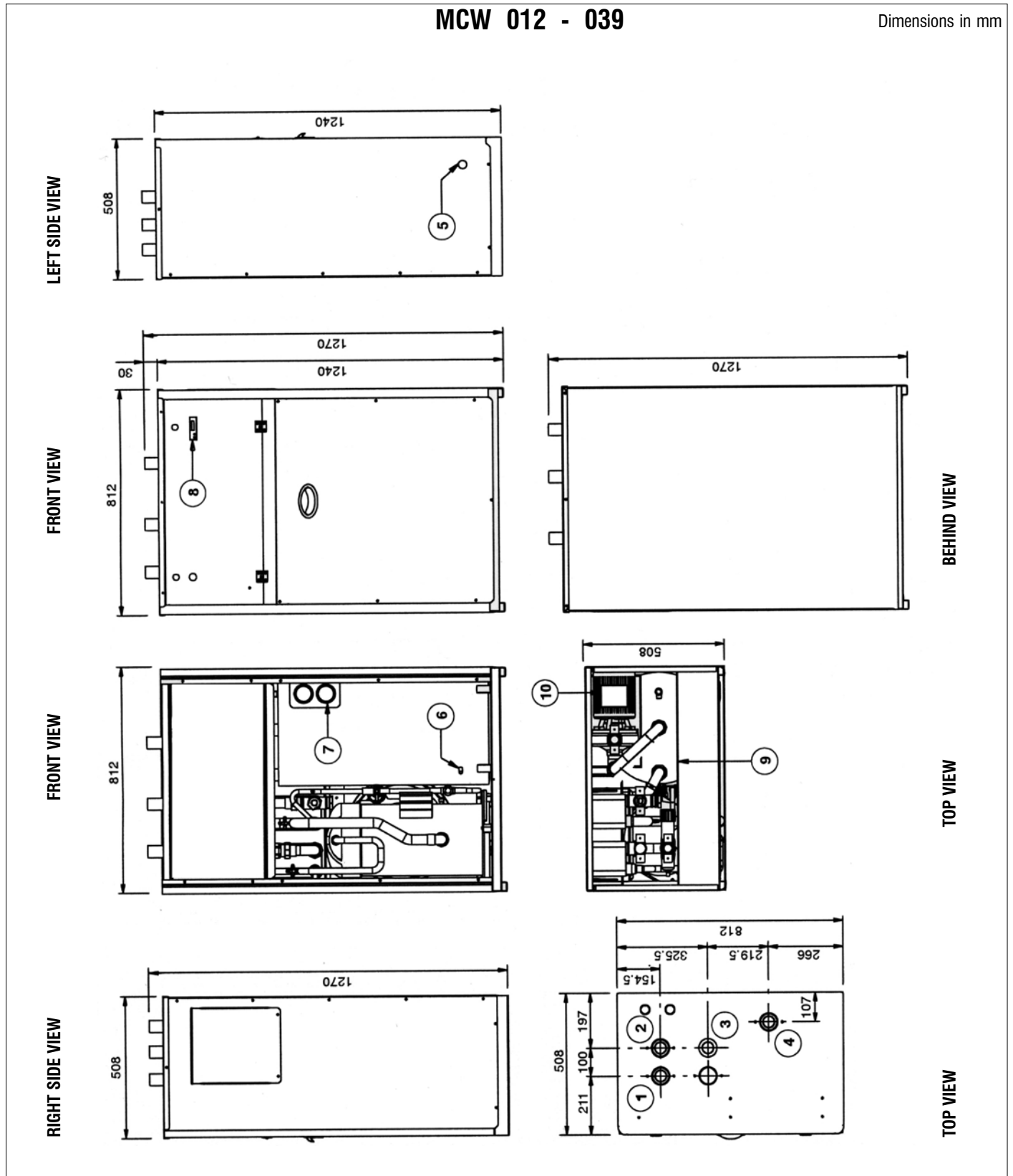
18 MCW OVERALL DIMENSIONS

- 1 Condensator water inlet (1 1/4" gas)
- 2 Condensator water outlet (1 1/4" gas)
- 3 Evaporator water inlet (1 1/4" gas)
- 3 Evaporator water outlet (1 1/4" gas)
- 5 Power supply cable inlet
- 6 Water buffer tank
- 7 Manometer refrigerant gauges (optionals)
- 8 Microprocessor control
- 9 Electrical box
- 10 Hydraulic pump



18 MCW OVERALL DIMENSIONS

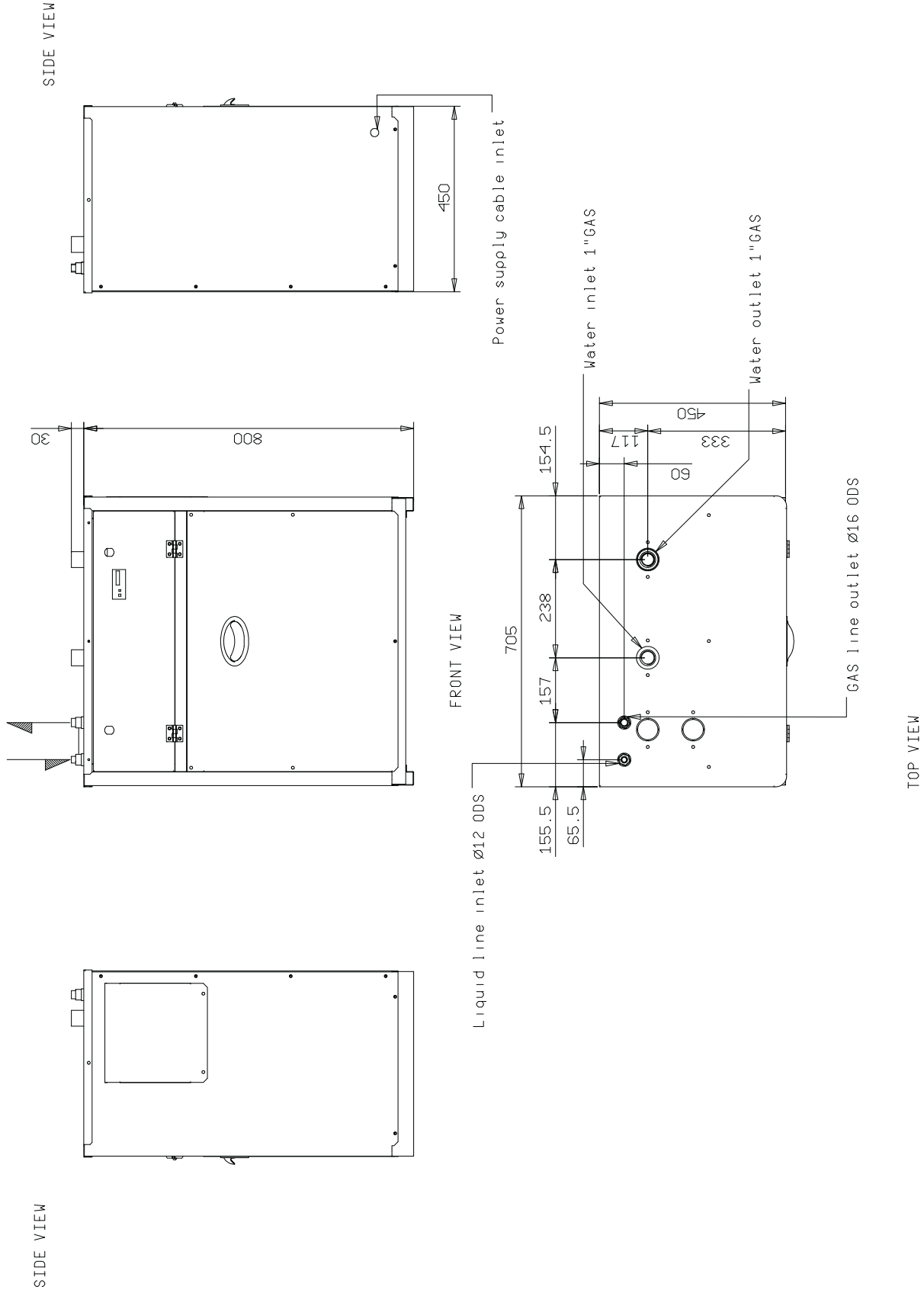
- 1 Condensator water inlet (1 1/4" gas)
- 2 Condensator water outlet (1 1/4" gas)
- 3 Evaporator water inlet (1 1/4" gas)
- 3 Evaporator water outlet (1 1/4" gas)
- 5 Power supply cable inlet
- 6 Water buffer tank
- 7 Manometer refrigerant gauges (optionals)
- 8 Microprocessor control
- 9 Electrical box
- 10 Hydraulic pump



19 MCR OVERALL DIMENSIONS

MCR 005 - 010

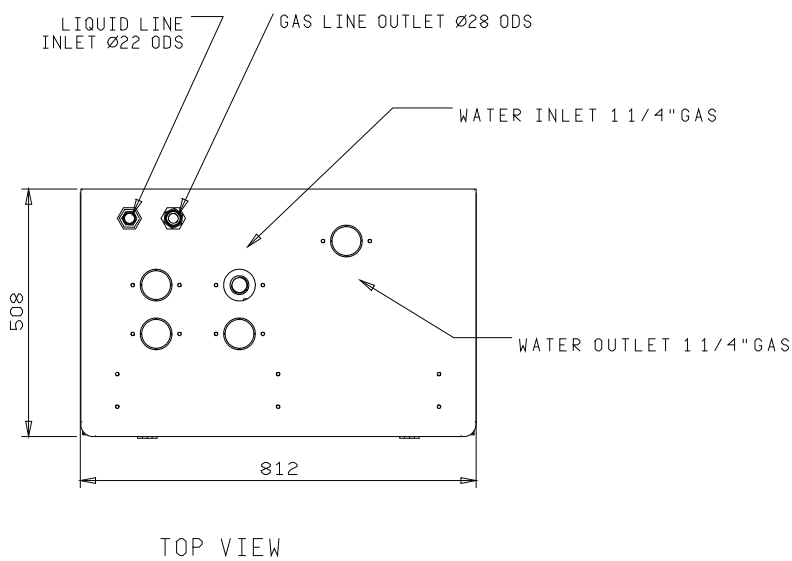
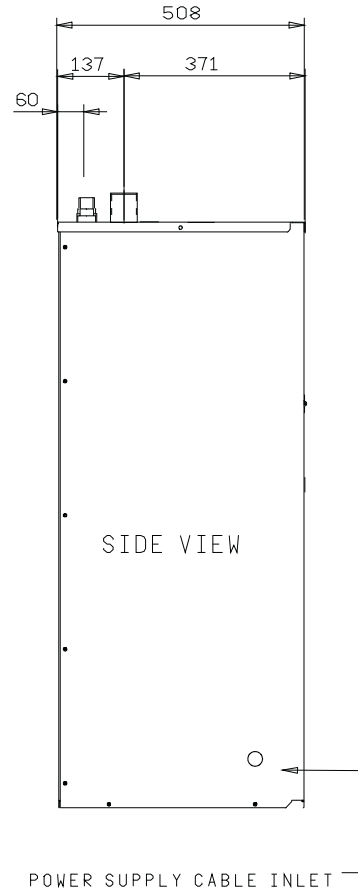
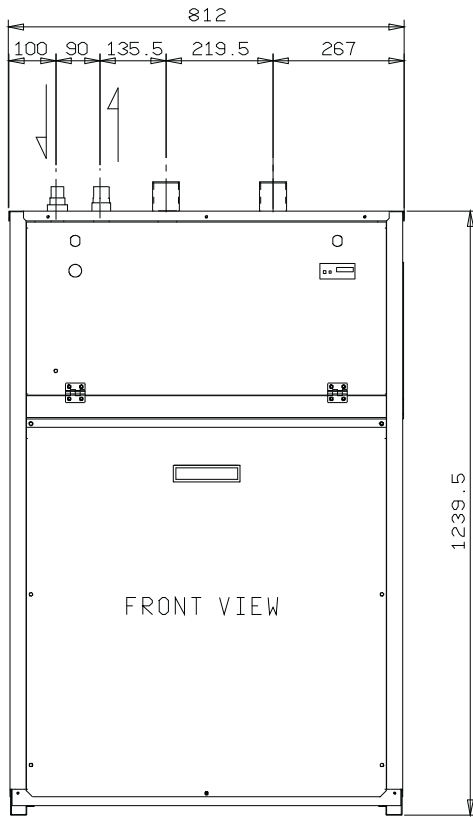
Dimensions in mm



19 MCR OVERALL DIMENSIONS

MCR 012 - 039

Dimensions in mm



20 DRY COOLER

It is possible to combine **DRY COOLERS** produced By **LUVE CONTARDO** with the Galletti water to water chillers and Galletti moto-evaporating units In the table at the button of the page , are reported the combinations between GALLETTI and **LUVE** units, already selected to operate in the nominal conditions; to operate in different conditions than nominal, contact Galletti office to verify the combination.

The available versions are the following:

- **DRY COOLER** standard version, horizontal outlet air flow ,complete with ON/OFF switch board and wiring.
- **DRY COOLER** standard version, horizontal outlet air flow ,complete with condensing control ,ON/OFF switch board ,temperature probe and wiring.
- **DRY COOLER** standard version, vertical outlet air flow ,complete with feet kit, ON/OFF switch board and wiring.
- **DRY COOLER** standard version, vertical outlet air flow ,complete with condensing control , feet kit, ON/OFF switch board, air probe and wiring.
- **DRY COOLER** silent version, horizontal outlet air flow ,complete with ON/OFF switch board and wiring
- **DRY COOLER** silent version, horizontal outlet air flow ,complete with condensing control ,ON/OFF switch board ,temperature probe and wiring
- **DRY COOLER** silent version, vertical outlet air flow ,complete with feet kit, ON/OFF switch board and wiring
- **DRY COOLER** silent version, vertical outlet air flow ,complete with condensing control , feet kit, ON/OFF switch board, temperature probe and wiring

20.1 DRY COOLER TABLE MATCHING

MODEL	MCW CS MCW HS	Code for Remote Condenser with vertical air flow	Code for Remote Condenser with horizontal air flow	Power Supply V - ph - Hz
SINGLE CIRCUIT	005	SHLR 15 M H	SHLR 15 M V	230-1-50 hz / 400-3-50 hz
	007	SHLR 15 M H	SHLR 15 M V	230-1-50 hz / 400-3-50 hz
	010	SHLN 24 D H	SHLN 24 D V	230-1-50 hz / 400-3-50 hz
	012	SHLN 24 D H	SHLN 24 D V	230-1-50 hz / 400-3-50 hz
	015	SHLN 24 D H	SHLN 24 D V	230-1-50 hz / 400-3-50 hz
	018	SHLN 29 L H	SHLN 29 L V	230-1-50 hz / 400-3-50 hz
	020	SHLN 30 D H	SHLN 30 D V	230-1-50 hz / 400-3-50 hz
	022	SHLN 30 D H	SHLN 30 D V	230-1-50 hz / 400-3-50 hz
	027	SHLN 50 C H	SHLN 50 C V	230-1-50 hz / 400-3-50 hz
	031	SHLN 50 C H	SHLN 50 C V	230-1-50 hz / 400-3-50 hz
039	SHLN 58 D H	SHLN 58 D V	230-1-50 hz / 400-3-50 hz	
MODEL	MCW CL MCW HL	Code for Remote Condenser with vertical air flow	Code for Remote Condenser with horizontal air flow	Power Supply V - ph - Hz
SINGLE CIRCUIT	005	SHLR 15 M H	SHLR 15 M V	230-1-50 hz / 400-3-50 hz
	007	SHLR 15 M H	SHLR 15 M V	230-1-50 hz / 400-3-50 hz
	010	SHLS 19 M H	SHLS 19 M V	230-1-50 hz / 400-3-50 hz
	012	SHLS 19 M H	SHLS 19 M V	230-1-50 hz / 400-3-50 hz
	015	SHLS 38 D H	SHLS 38 D V	230-1-50 hz / 400-3-50 hz
	018	SHLS 38 D H	SHLS 38 D V	230-1-50 hz / 400-3-50 hz
	020	SHLS 38 D H	SHLS 38 D V	230-1-50 hz / 400-3-50 hz
	022	SHLS 38 D H	SHLS 38 D V	230-1-50 hz / 400-3-50 hz
	027	SHLS 38 D H	SHLS 38 D V	230-1-50 hz / 400-3-50 hz
	031	SHLS 59 C H	SHLS 59 C V	230-1-50 hz / 400-3-50 hz
039	SHLS 59 C H	SHLS 59 C V	230-1-50 hz / 400-3-50 hz	

21 REMOTE CONDENSER

It is possible to combine **REMOTE CONDENSERS** produced By **LUVE CONTARDO** with the Galletti water to water chillers and Galletti moto-evaporating units

In the table at the button of the page , are reported the combinations between GALLETTI and **LUVE** units, already selected to operate in the nominal conditions; to operate in different conditions than nominal, contact Galletti office to verify the combination.

The available versions are the following:

- **REMOTE CONDENSER** standard version, horizontal outlet air flow,complete with ON/OFF switch board and wiring.
- **REMOTE CONDENSER** standard version, horizontal outlet air flow,complete with condensing control, ON/OFF switch board ,pressure probe and wiring.
- **REMOTE CONDENSER** standard version, vertical outlet air flow ,complete with feet kit, ON/OFF switch board and wiring.
- **REMOTE CONDENSER** standard version, vertical outlet air flow ,complete with feet kit, ON/OFF switch board pressure probe and wiring
- **REMOTE CONDENSER** silent version, horizontal outlet air flow ,complete with ON/OFF switch board and wiring
- **REMOTE CONDENSER** silent version, horizontal outlet air flow ,complete with ON/OFF switch board ,pressure probe and wiring
- **REMOTE CONDENSER** silent version, vertical outlet air flow ,complete with feet kit, ON/OFF switch board and wiring
- **REMOTE CONDENSER** silent version, vertical outlet air flow ,complete with feet kit, ON/OFF switch board pressure probe and wiring

21.1 REMOTE CONDENSER TABLE MATCHING

MODEL	MCR CS	Code for Remote Condenser with vertical air flow	Code for Remote Condenser with horizontal air flow	Power Supply V - ph - Hz
SINGLE CIRCUIT	005	SHVN 7/7 H	SHVN 7/7 V	230-1-50 hz
	007	SHVN 7/7 H	SHVN 7/7 V	230-1-50 hz
	010	SHVN 13/9 H	SHVN 13/9 V	230-1-50 hz
	012	SHVN 13/9 H	SHVN 13/9 V	230-1-50 hz
	015	SHVN 20/4 H	SHVN 20/4 V	230-1-50 hz
	018	SHVN 20/4 H	SHVN 20/4 V	230-1-50 hz
	020	SHVN 23/2 H	SHVN 23/2 V	230-1-50 hz
	022	SHVN 23/2 H	SHVN 23/2 V	230-1-50 hz
	027	SHVN 38/1 H	SHVN 38/1 V	230-1-50 hz
	031	SHVN 38/1 H	SHVN 38/1 V	230-1-50 hz
039	SHVN 46/5 H	SHVN 46/5 V	230-1-50 hz	
MODEL	MCR CL	Code for Remote Condenser with vertical air flow	Code for Remote Condenser with horizontal air flow	Power Supply V - ph - Hz
SINGLE CIRCUIT	005	SHVS 8/2 H	SHVS 8/2 V	230-1-50 hz
	007	SHVS 8/2 H	SHVS 8/2 V	230-1-50 hz
	010	SHVS 18/0 H	SHVS 18/0 V	230-1-50 hz
	012	SHVS 18/0 H	SHVS 18/0 V	230-1-50 hz
	015	SHVS 18/0 H	SHVS 18/0 V	230-1-50 hz
	018	SHVS 18/0 H	SHVS 18/0 V	230-1-50 hz
	020	SHVS 27/1 H	SHVS 27/1 V	230-1-50 hz
	022	SHVS 27/1 H	SHVS 27/1 V	230-1-50 hz
	027	SHVS 36/0 H	SHVS 36/0 V	230-1-50 hz
	031	SHVS 36/0 H	SHVS 36/0 V	230-1-50 hz
039	SHVS 48/1 H	SHVS 48/1 V	230-1-50 hz	

21 REMOTE CONDENSER

21.2 DESIGN CRITERIA FOR REFRIGERANT PIPING

Piping for refrigerant system should be designed according 3 main principles:

1. Reduction of the pressure drops for avoid to significant decreasing of the performances.
2. Ensure the correct oil return also at partial load when the refrigerant speed is reduce.
Please note that the pressure drop depends also to the surfacefriction between gas and pipe and surface friction is the "engine" for the oil drag. The oil drag is much critical in the suction line because the lower temperatures and consequent higher oil viscosity.
3. Avoid the creation of "flash vapours" on the liquid line and consequents malfunction of the expansion valve. Avoid to have high liquid speeds to avoid pressure peaks when solenoid valve is closing.

GENERAL PARAMETERS

- minimum gas speed to ensure oil drag even in vertical piping, for discharge line is 4 m/s;
- for liquid line, the miscibility between oil and refrigerant is 100% (in our T field) so that no minimum speed is required.

Refrigerant		R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C
Cooling capacity	kW	4-5	6-7	8-9	10-11,5	11,5-13	14-16	17-18	19-24	25-29	30-34	35-40
T ev. - Dew Point	°C	0/+10°C	0/+10°C	0/+10°C	0/+10°C	0/+10°C	0/+10°C	0/+10°C	0/+10°C	0/+10°C	0/+10°C	0/+10°C
Discharge gas line 0-10n	[mm]	12	12	12	16	16	16	16	22	22	22	28
Liquid line 0-10m	[mm]	10	10	10	12	12	12	12	16	16	16	18
Discharge gas line 11-20	[mm]	12	12	16	16	16	18	18	22	22	28	28
Liquid line 11-20m	[mm]	10	10	12	12	12	12	12	16	16	18	18
Discharge gas line 21-30	[mm]	12	12	16	16	16	18	18	22	22	28	28
Liquid line 21-30m	[mm]	10	10	12	12	12	12	12	16	16	18	18

21 REMOTE CONDENSER

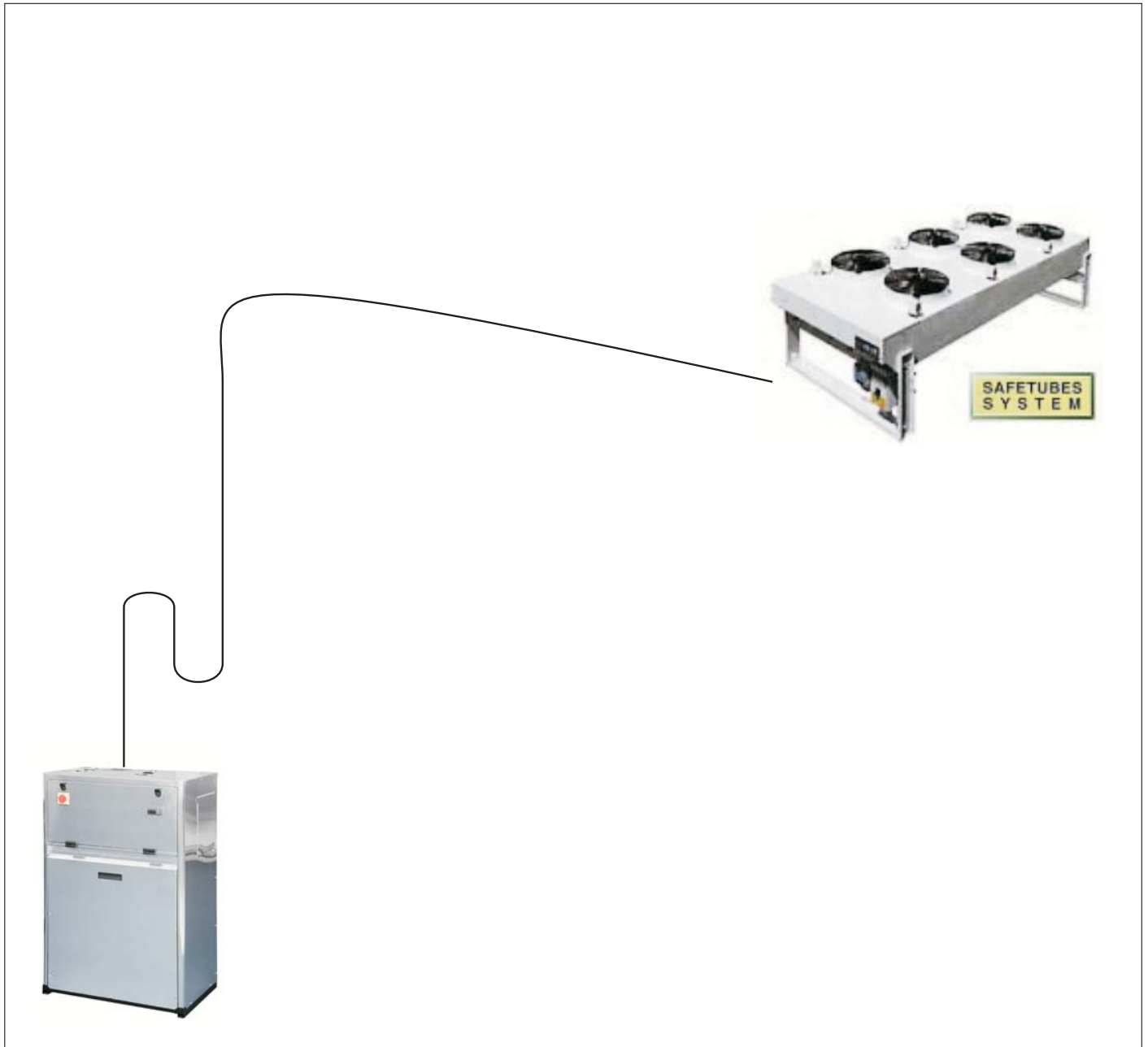
21.3 REFERENCE FOR ON SITE INSTALLED PIPES

External diameters [mm]	Thickness [mm]	Bending radius [mm]	Design pressure [bar]	Pipes PED category	max.copper strenght [N/mm ²]	real stress [N/mm ²]	Safety coefficient
10	1	36	28	A3 P3	227	11,2	20,3
12	1	36	28	A3 P4	227	14	16,2
16	1	46	28	A3 P3	227	19,6	11,6
18	1	56	28	A3 P3	227	21	10,8
22	1,5	67	28	A3 P3	227	17,3	13,1
28	1,5	96	28	A3 P3	227	23,3	9,8
35	1,5	70	28	A3P3	227	29,8	7,6
42	1,5	84	28	A3P3	227	36,4	6,2
54	2	108	28	A3P3	227	35	6,4

21 REMOTE CONDENSER

21.4 CONNECTION EXAMPLES

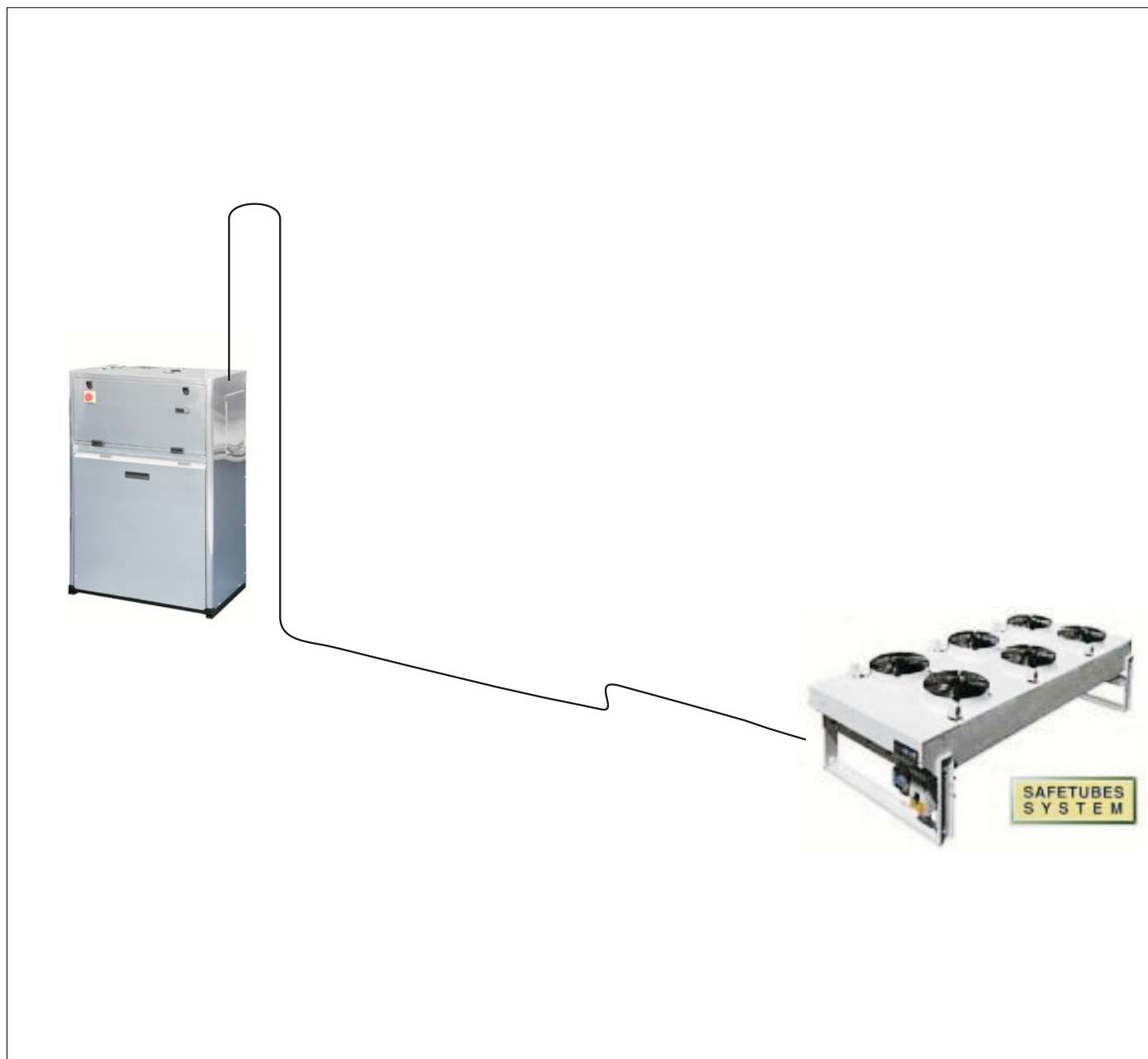
21.4.1 Remote condenser installed above the condenserless unit



21 REMOTE CONDENSER

21.4 CONNECTION EXAMPLES

21.4.2 Remote condenser installed below the condenserless unit



22 PLACING THE UNIT AND TECHNICAL SPACE

You should bear in mind the following aspects when choosing the best site for installing the unit and the relative connections:

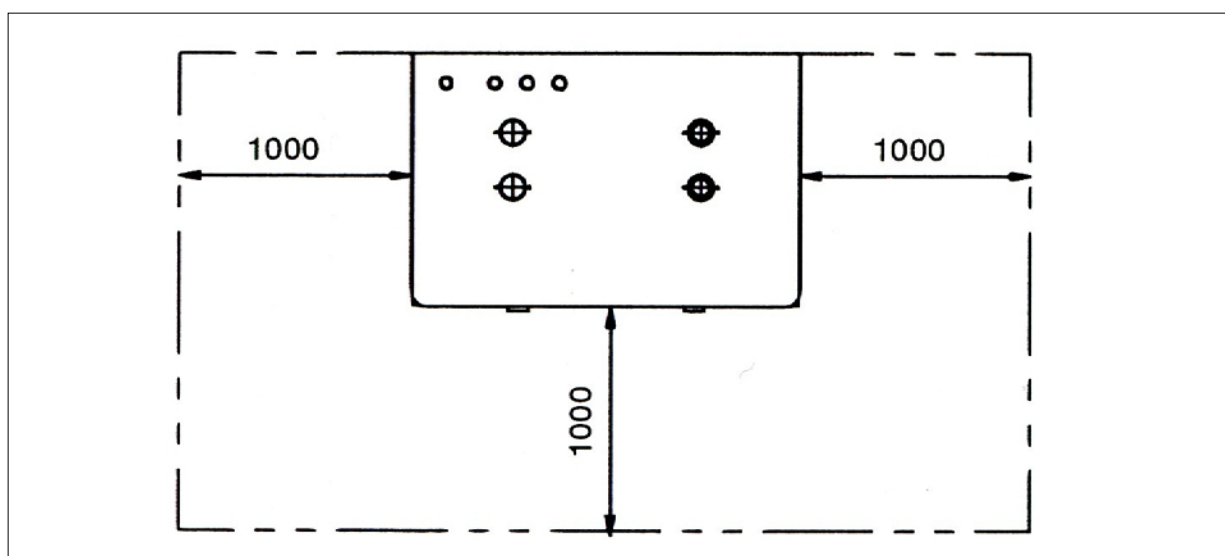
- size and origin of water pipes;
- location of power supply;
- accessibility for maintenance or repairs;
- solidity of the supporting surface;
- possible reverberation of sound waves.

All models belonging to the **MCW** and **MCR** series are designed and built for indoor installation.

It is advisable to place a rigid rubber strip between the base frame and the supporting surface.

Whenever more effective insulation is required, it is recommended to use vibrating-damping spring supports.

It is necessary to guarantee the clearances reported in the pictures below.





40010 Bentivoglio (BO)
Via Romagnoli, 12/a
Tel. 051/8908111
Fax 051/8908122
www.galletti.it

Company UNI EN ISO 9001 and OHSAS 18001 certified